

# MVA and Isolation

PF Id mva > 0.85 &&  
mva < 0.9

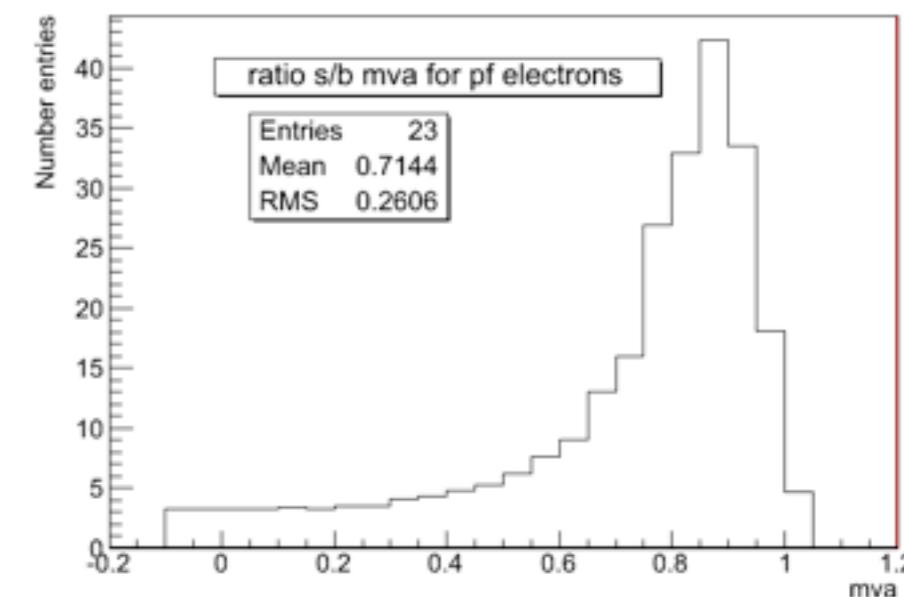
I checked the optimisations we were doing comparing it with the significance plots for leptons (prompt/sqrt(fakes + hf)) I did.

I took three cases:

The case in which we ask for Id Tight just for comparison

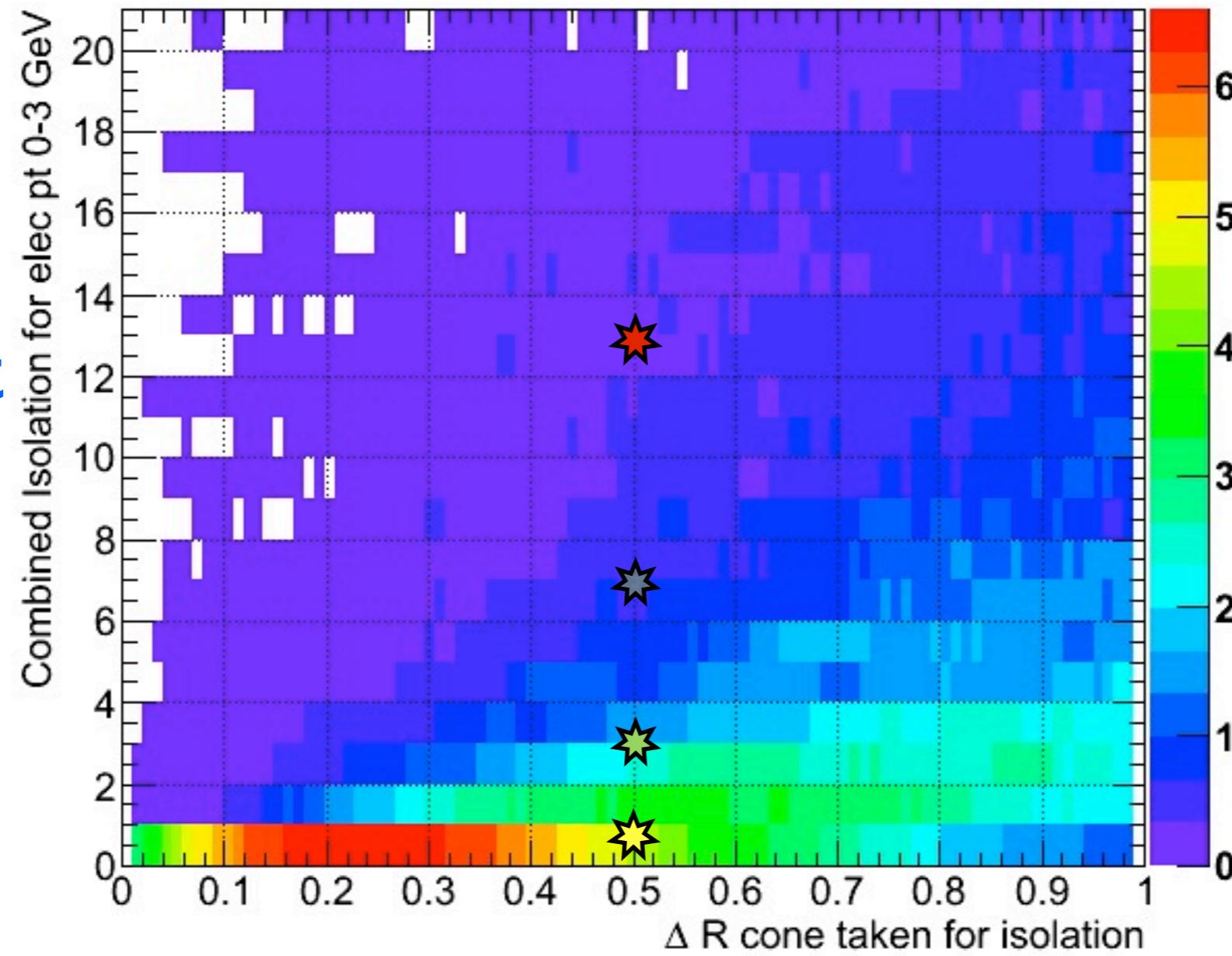
The case taking the cut values over the pfElldipi we obtain from the optimisation.

Same case as before but adding h over e cut

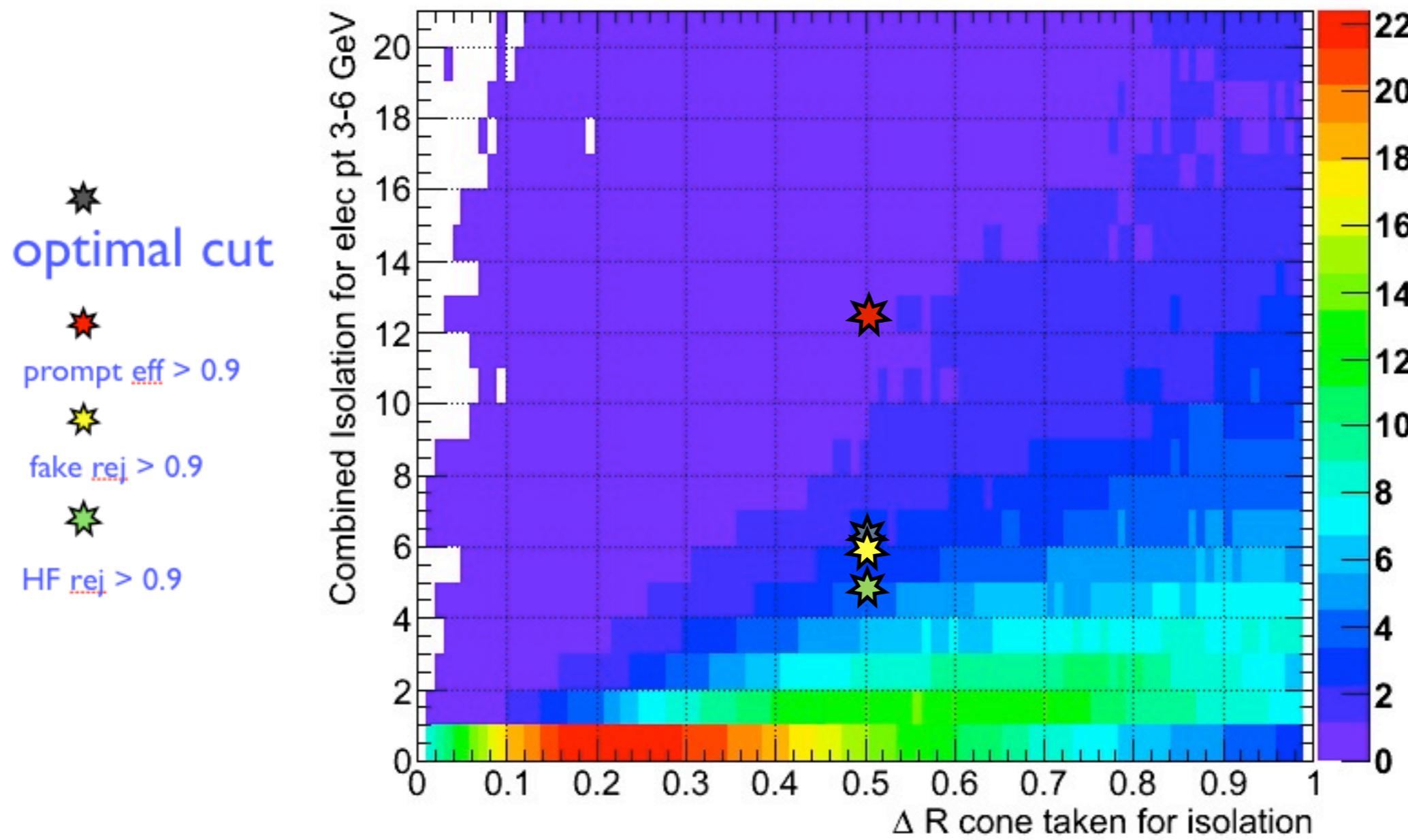


# PF Electrons pt 0-3

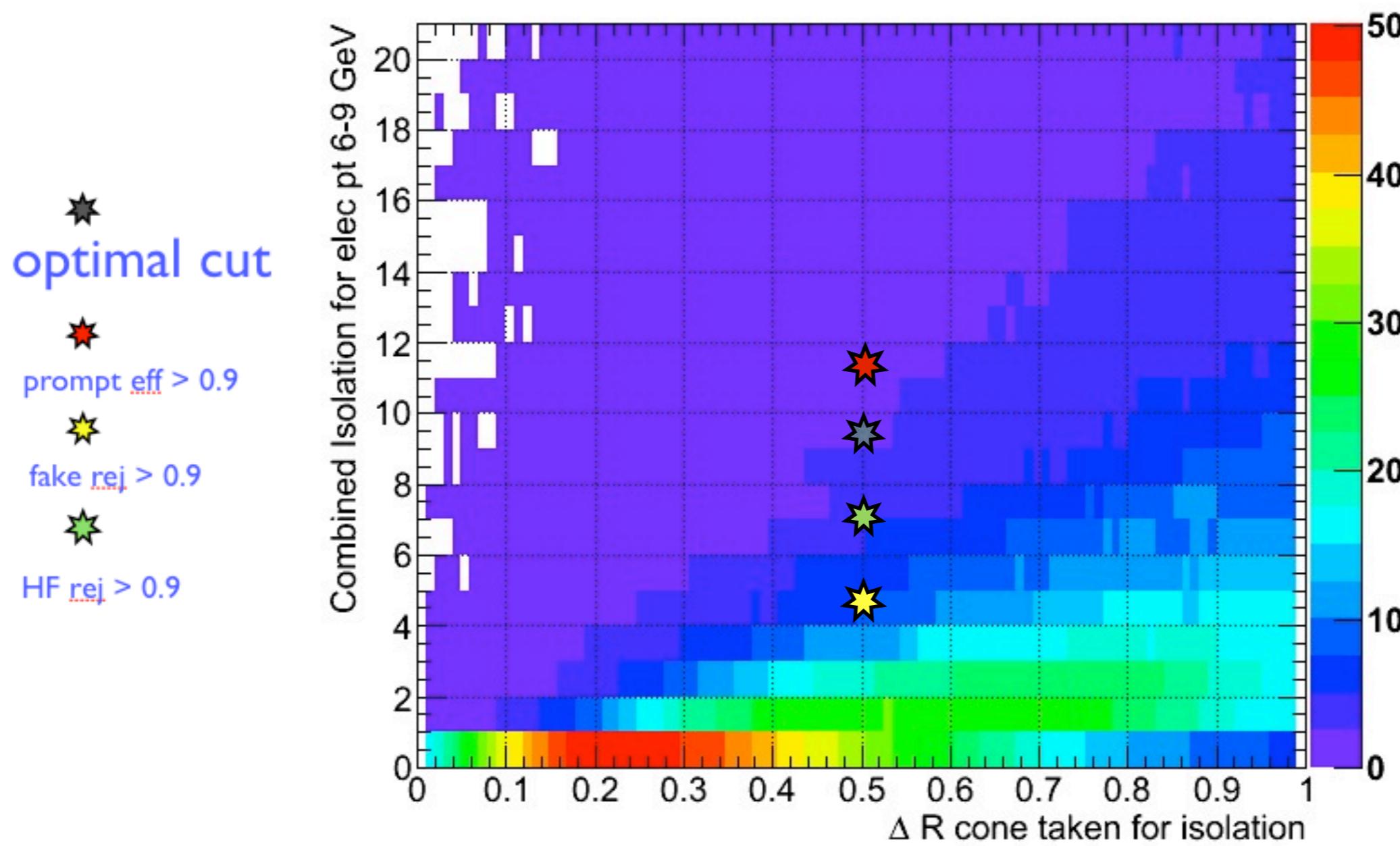
- ★ optimal cut
- ★ prompt eff > 0.9
- ★ fake rej > 0.9
- ★ HF rej > 0.9



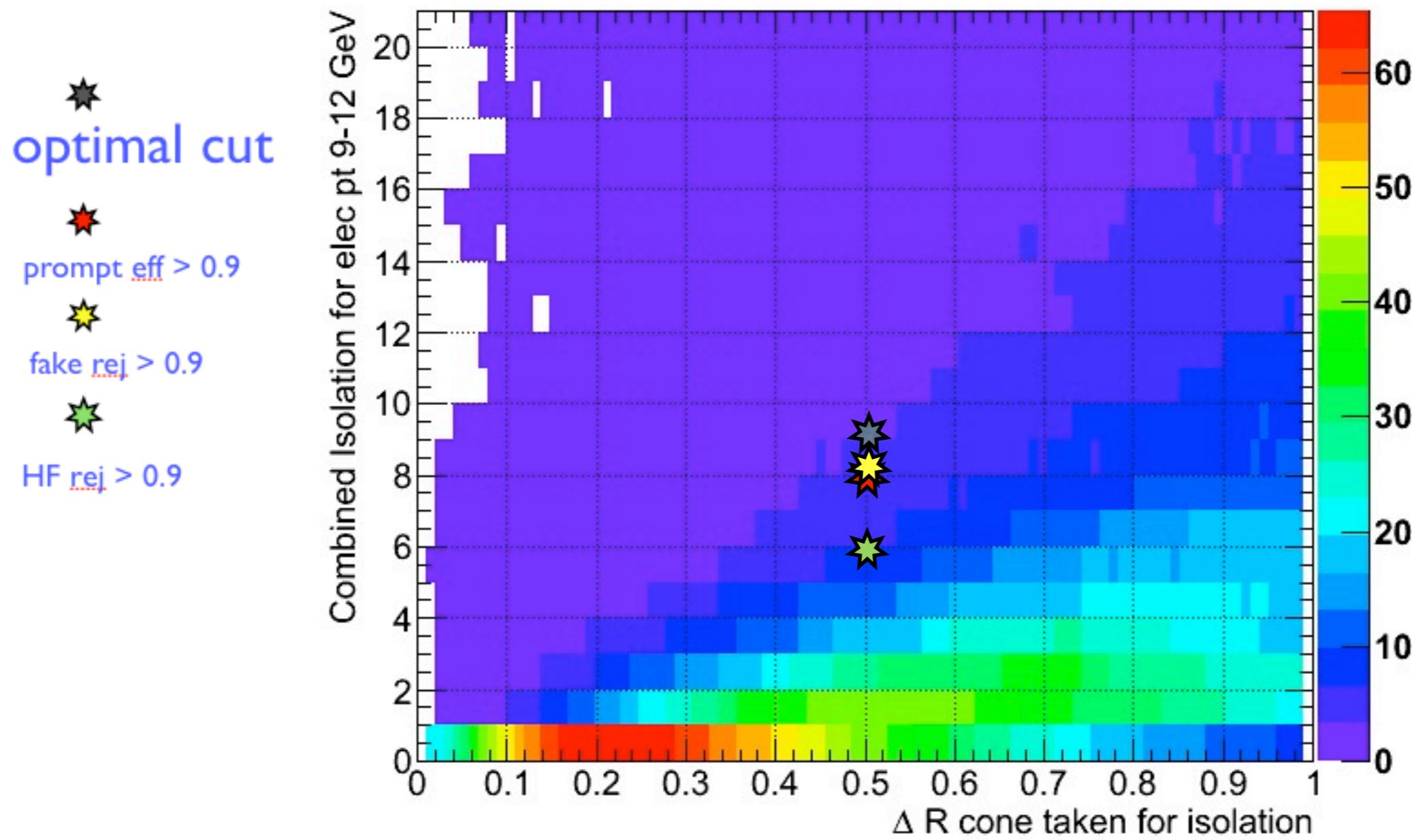
# PF Electrons pt 3-6



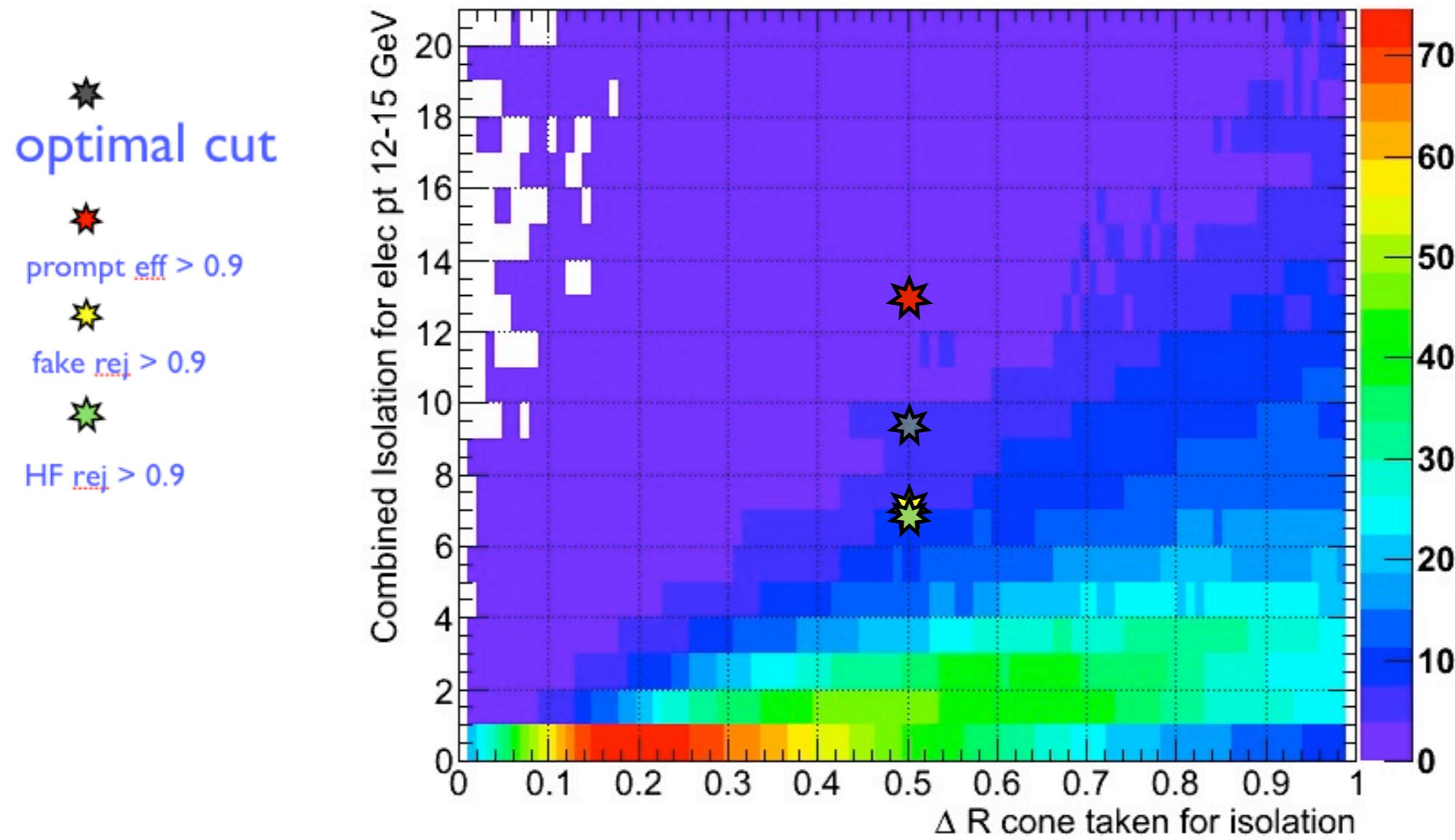
# PF Electrons pt 6-9



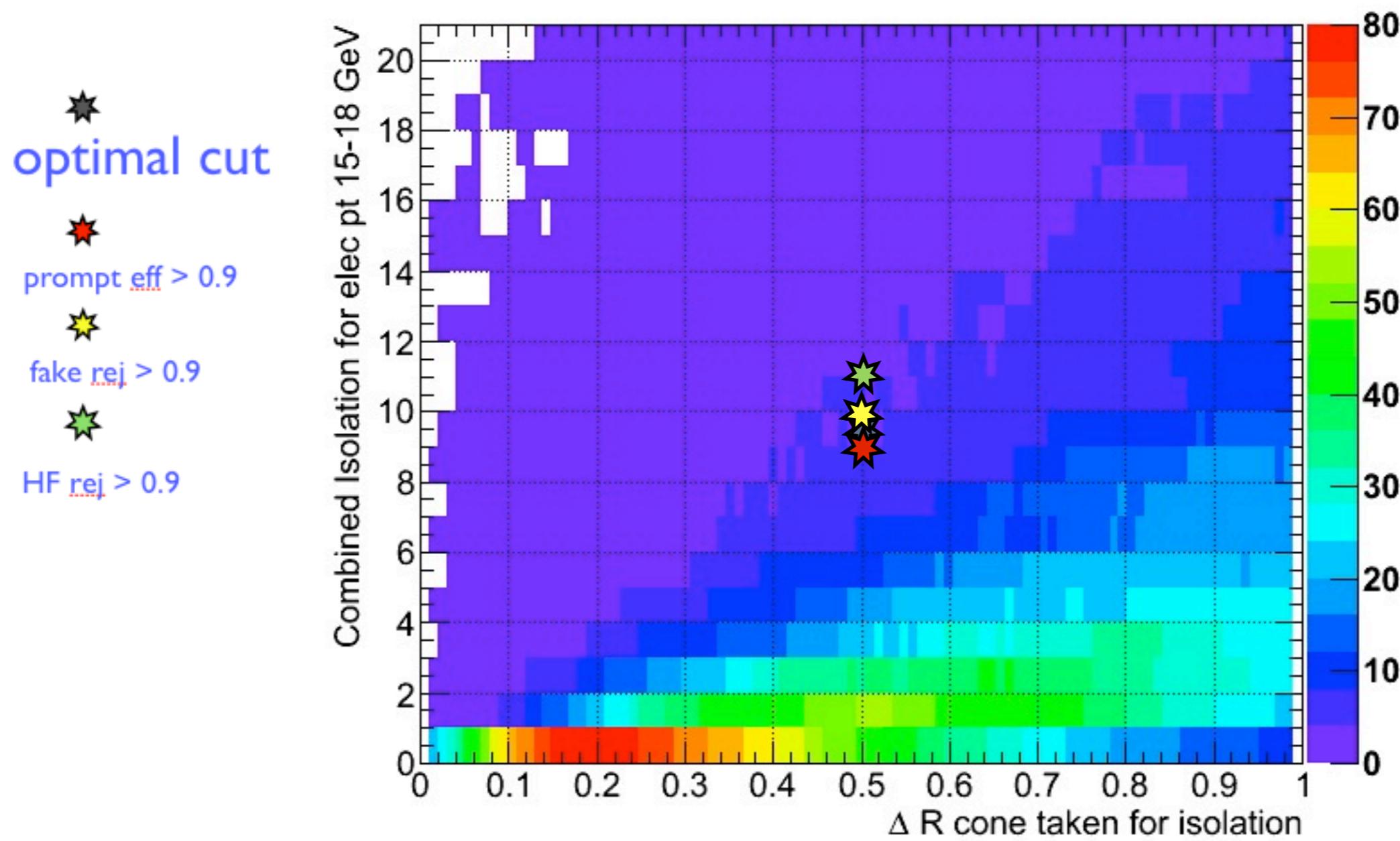
# PF Electrons pt 9-12



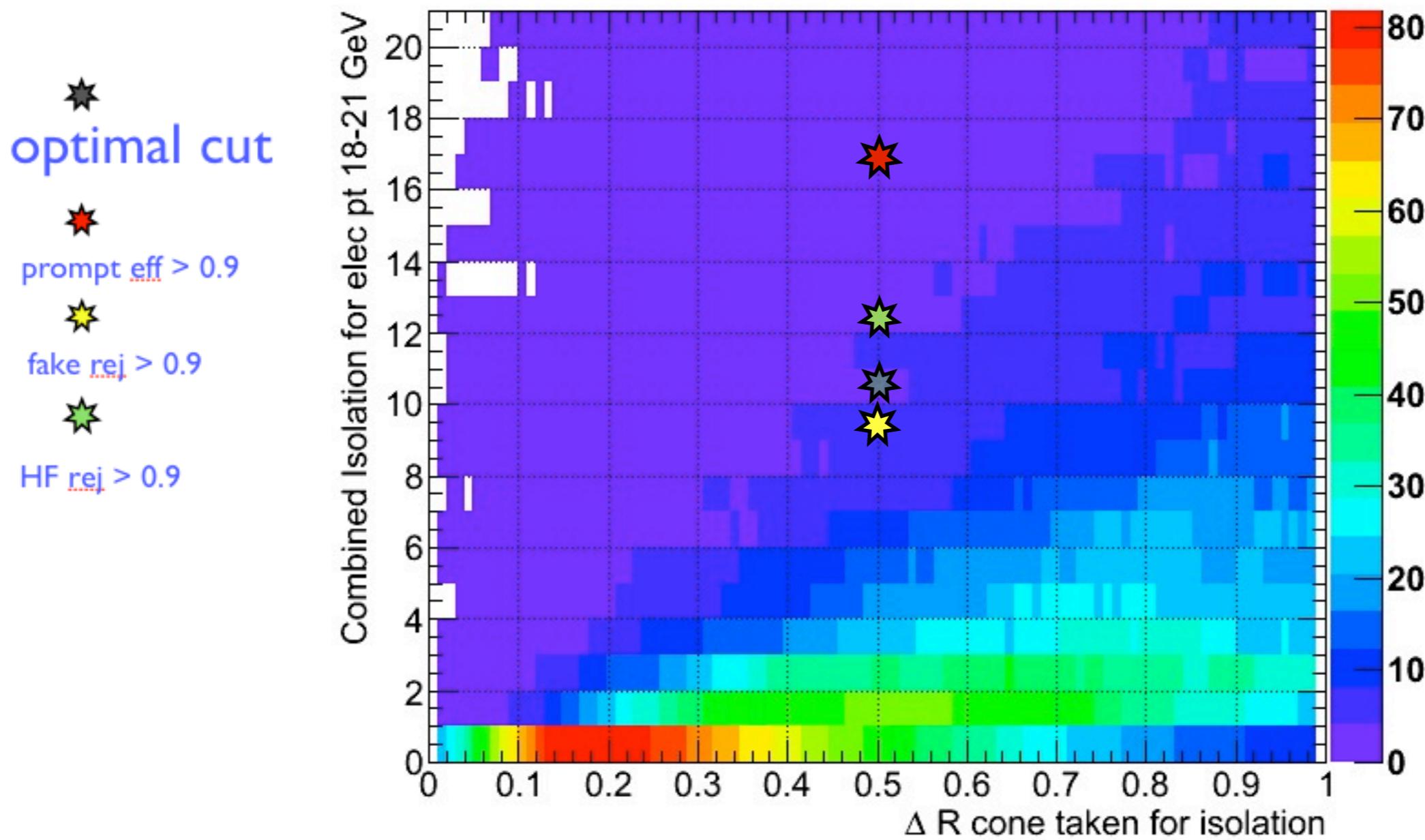
# PF Electrons pt 12-15



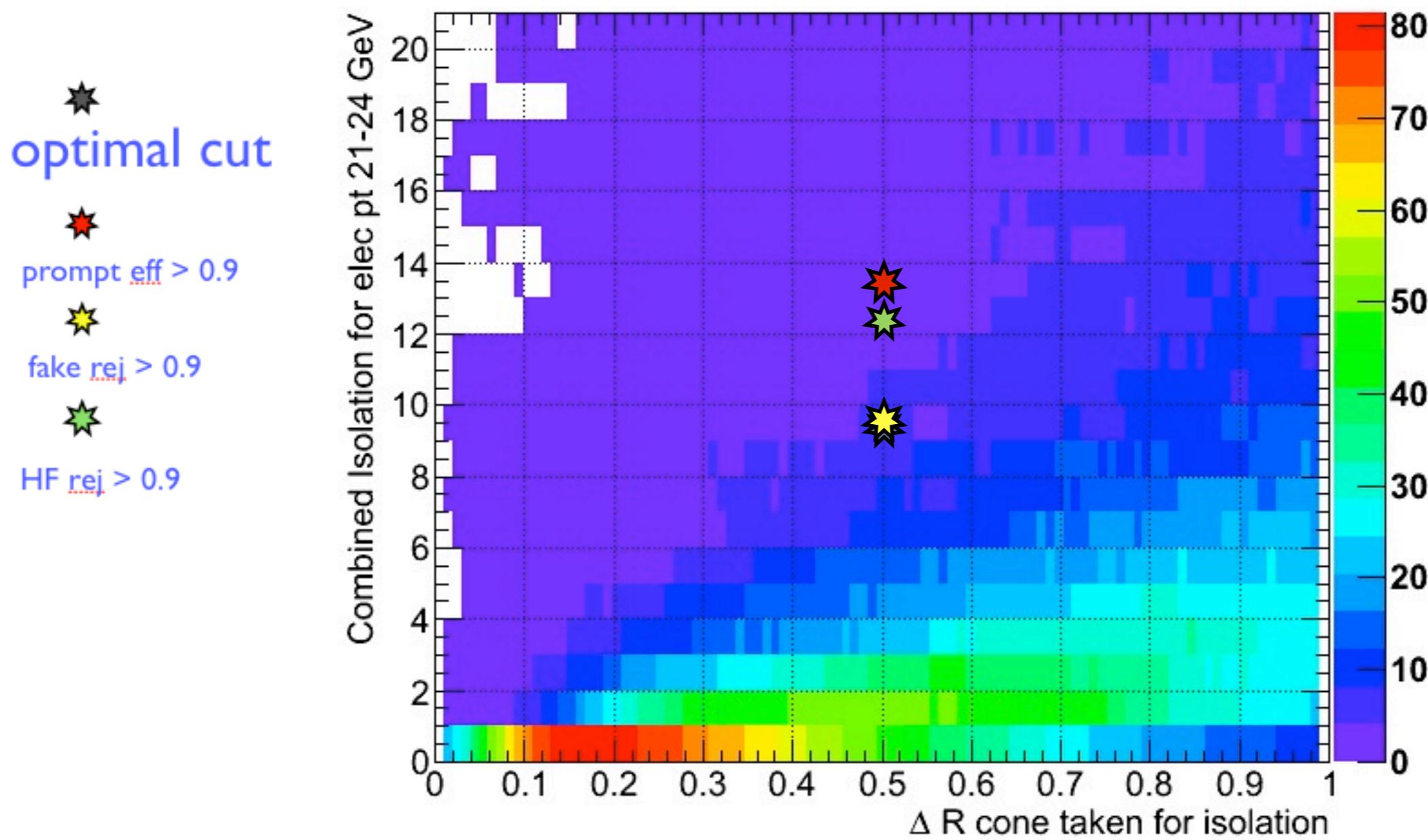
# PF Electrons pt 15-18



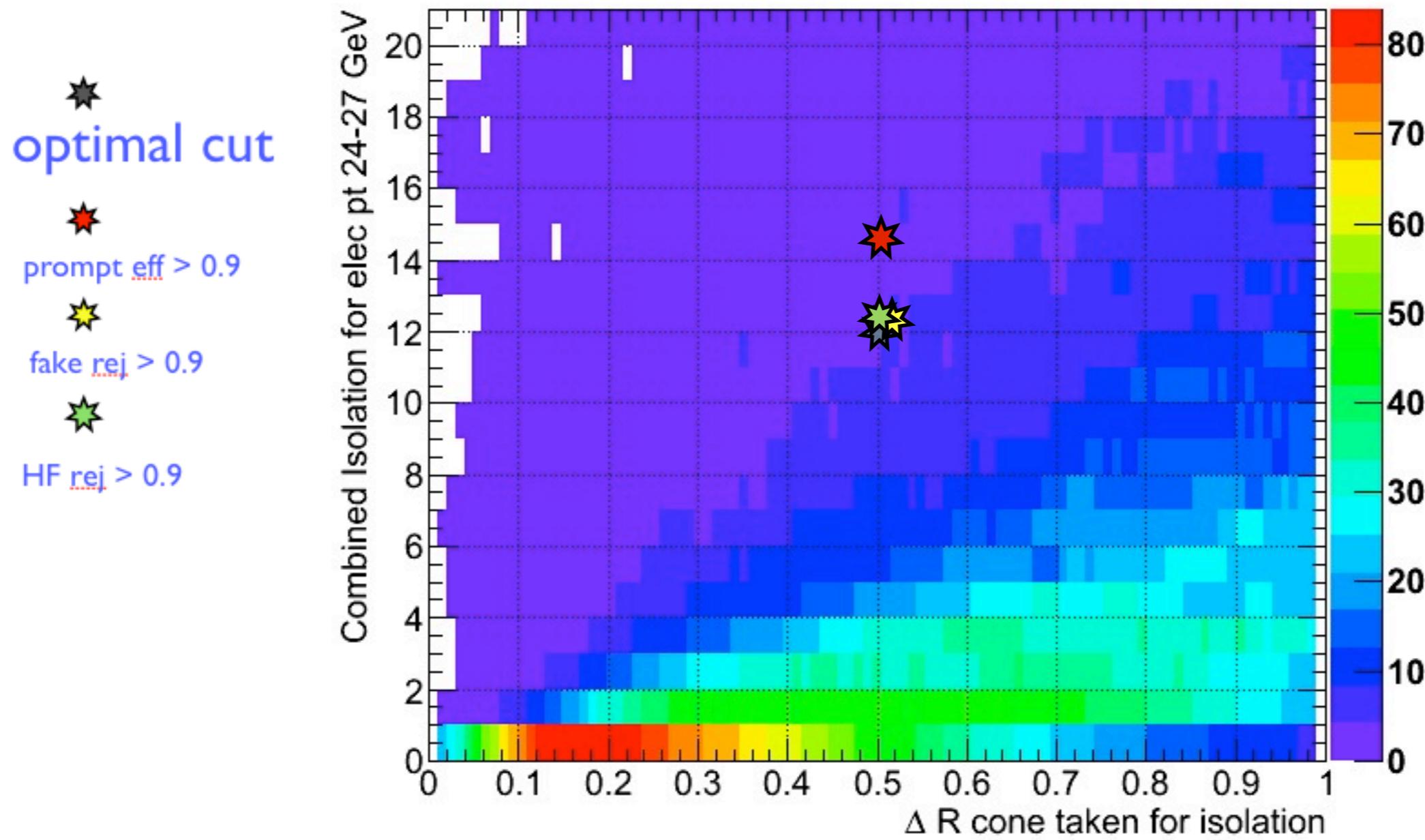
# PF Electrons pt 18-21



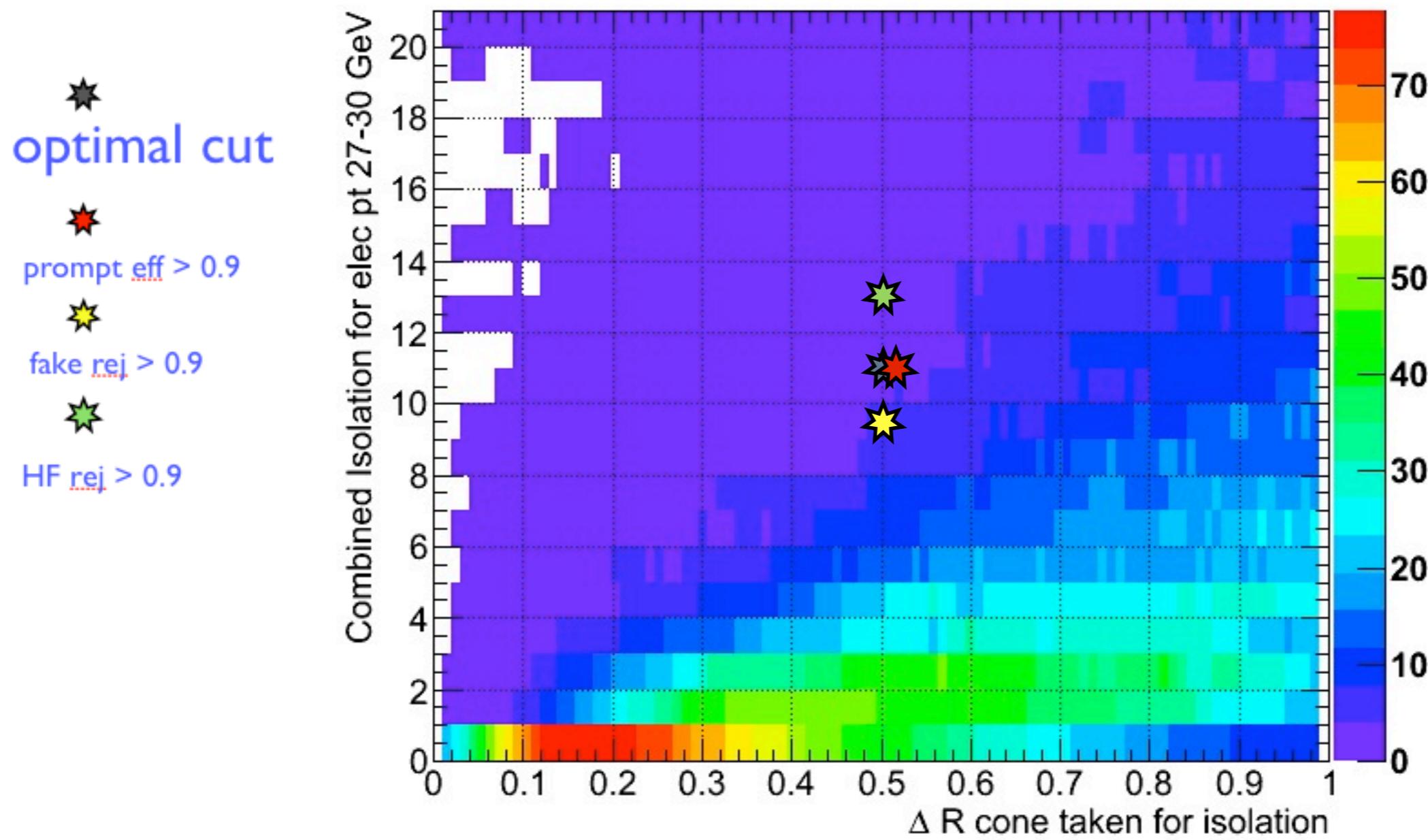
# PF Electrons pt 21-24



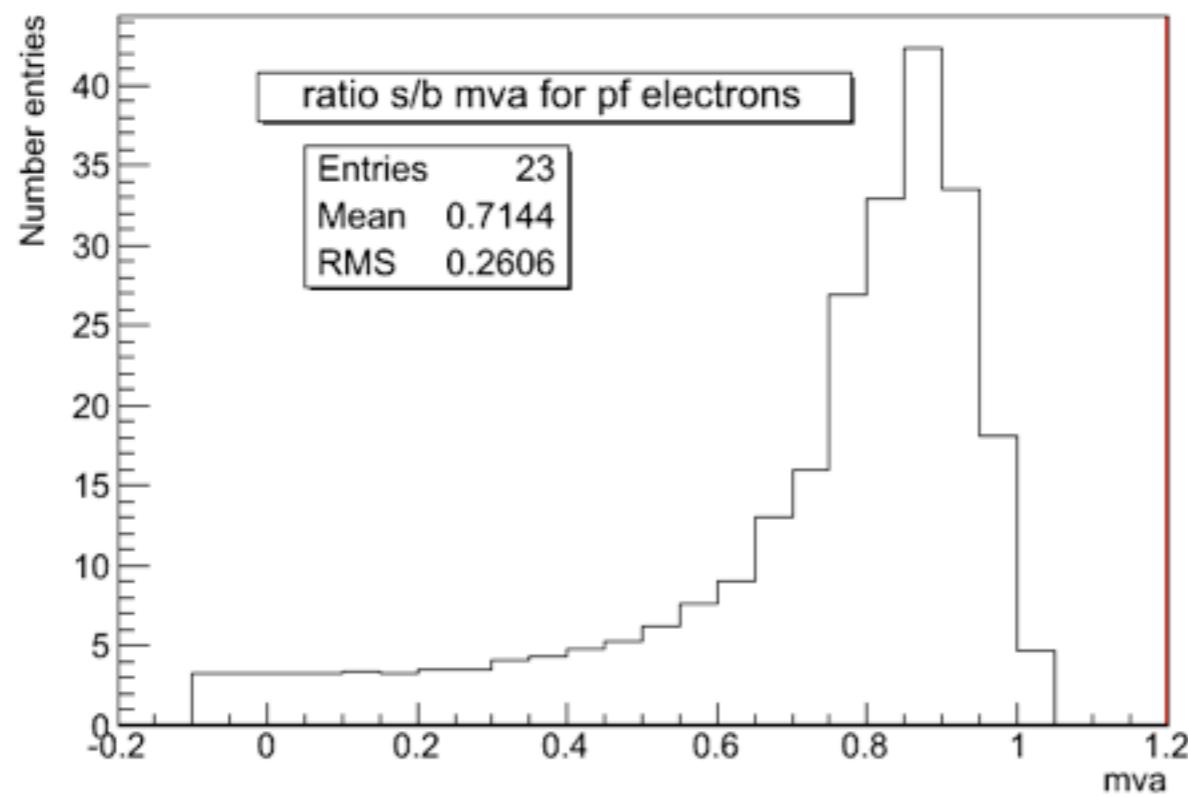
# PF Electrons pt 24-27



# PF Electrons pt 27-30

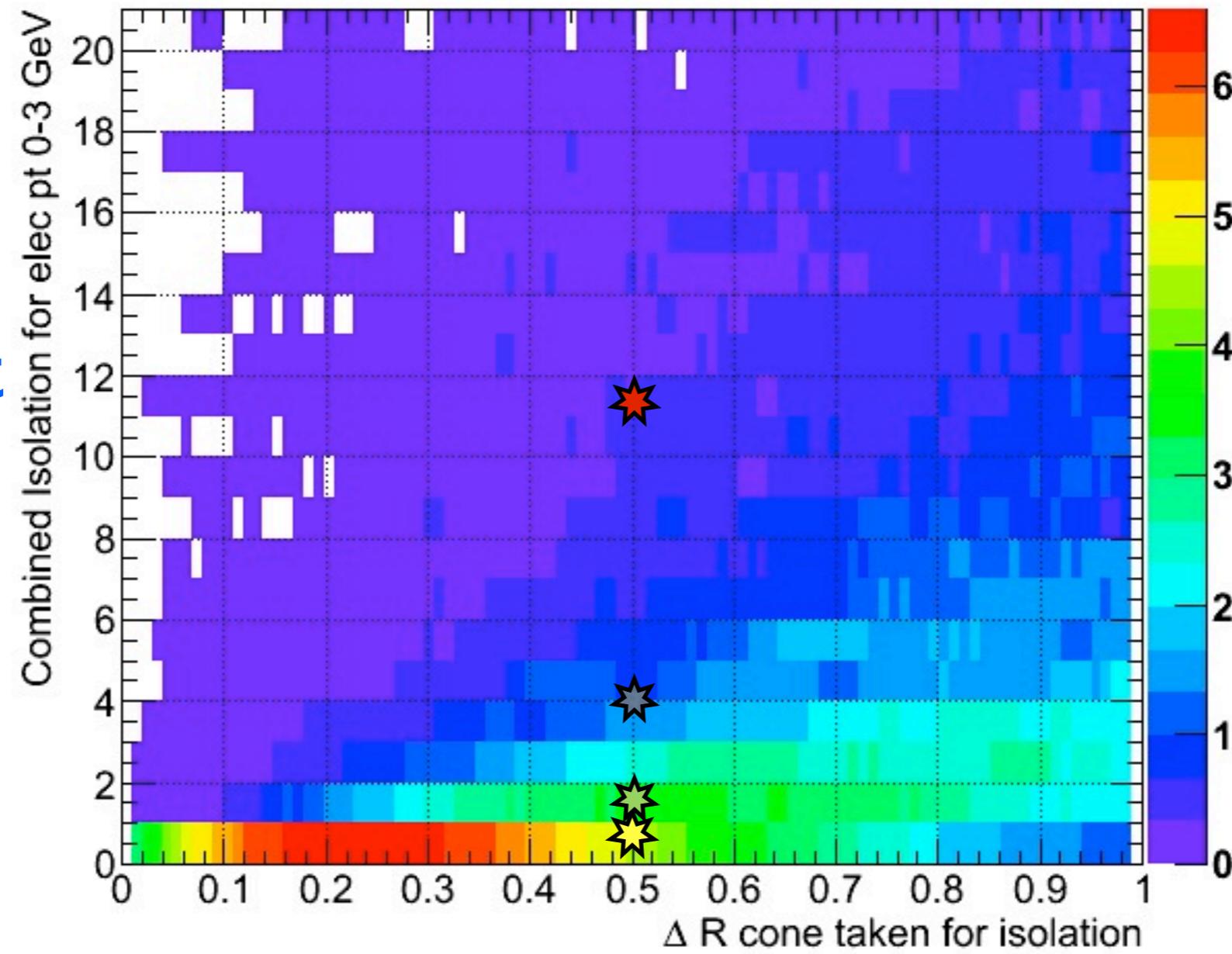


PF Id  $0.85 < \text{mva} < 0.9$   
and  $H \text{ over } E < 0.02$

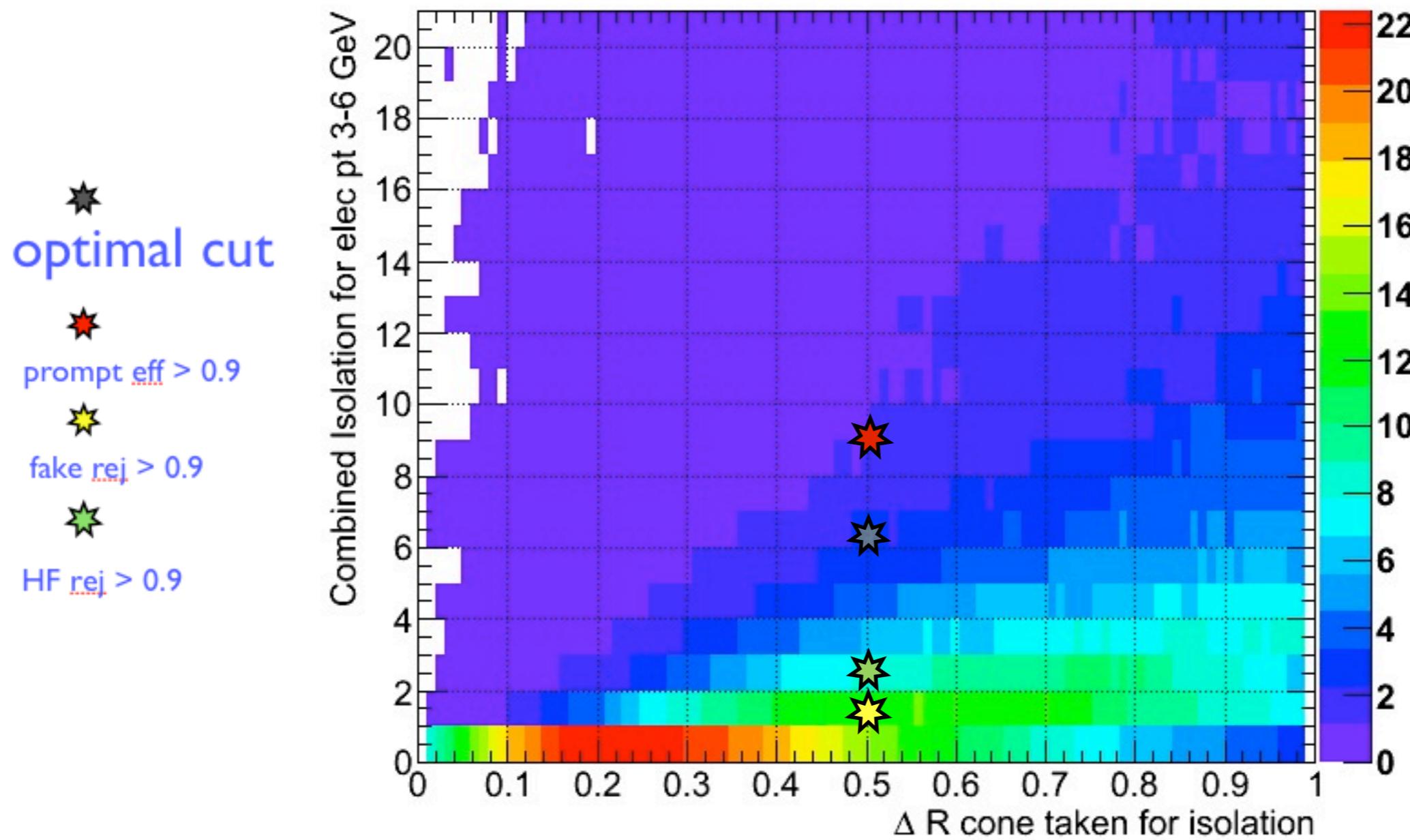


# PF Electrons pt 0-3

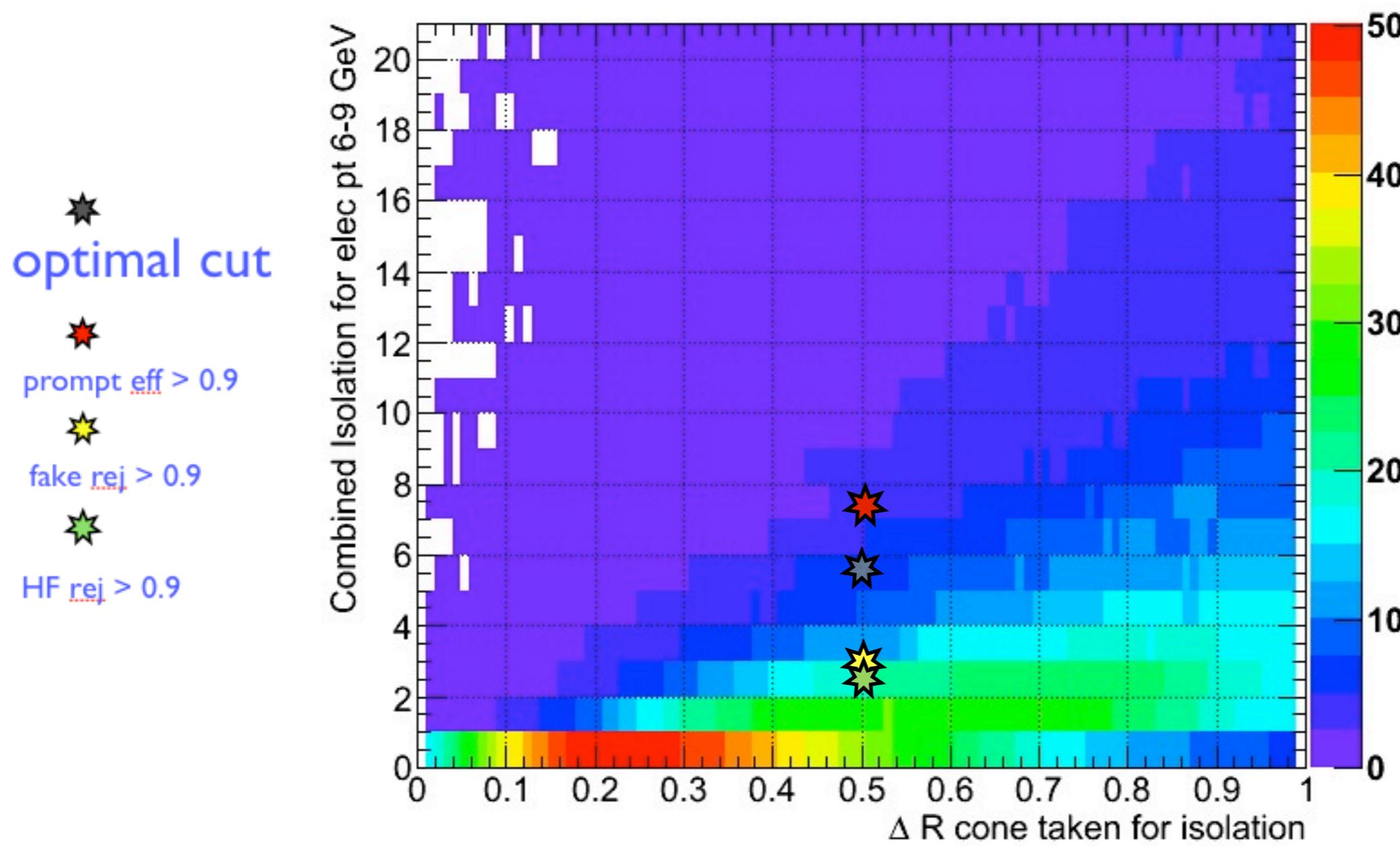
- ★ optimal cut
- ★ prompt eff > 0.9
- ★ fake rej > 0.9
- ★ HF rej > 0.9



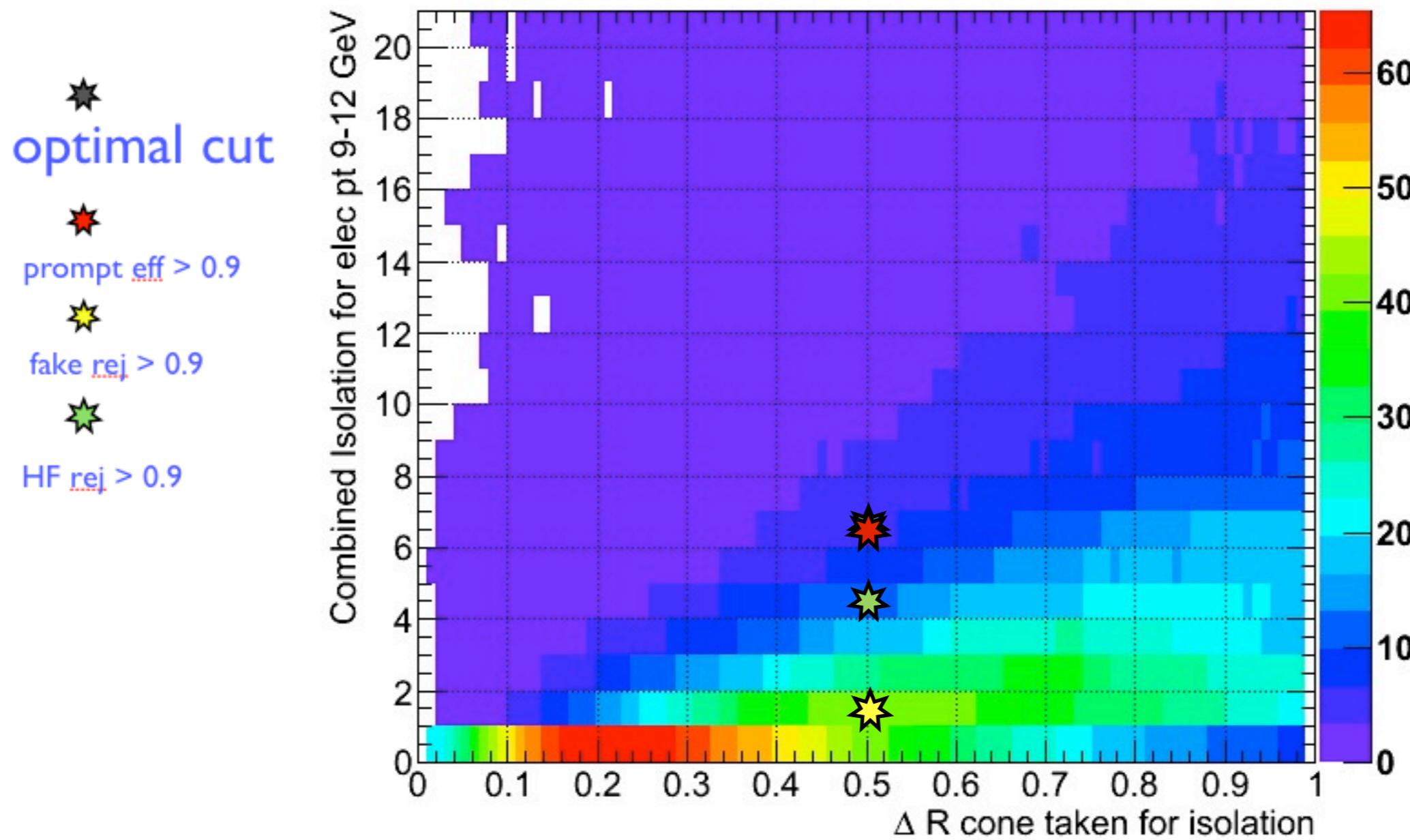
# PF Electrons pt 3-6



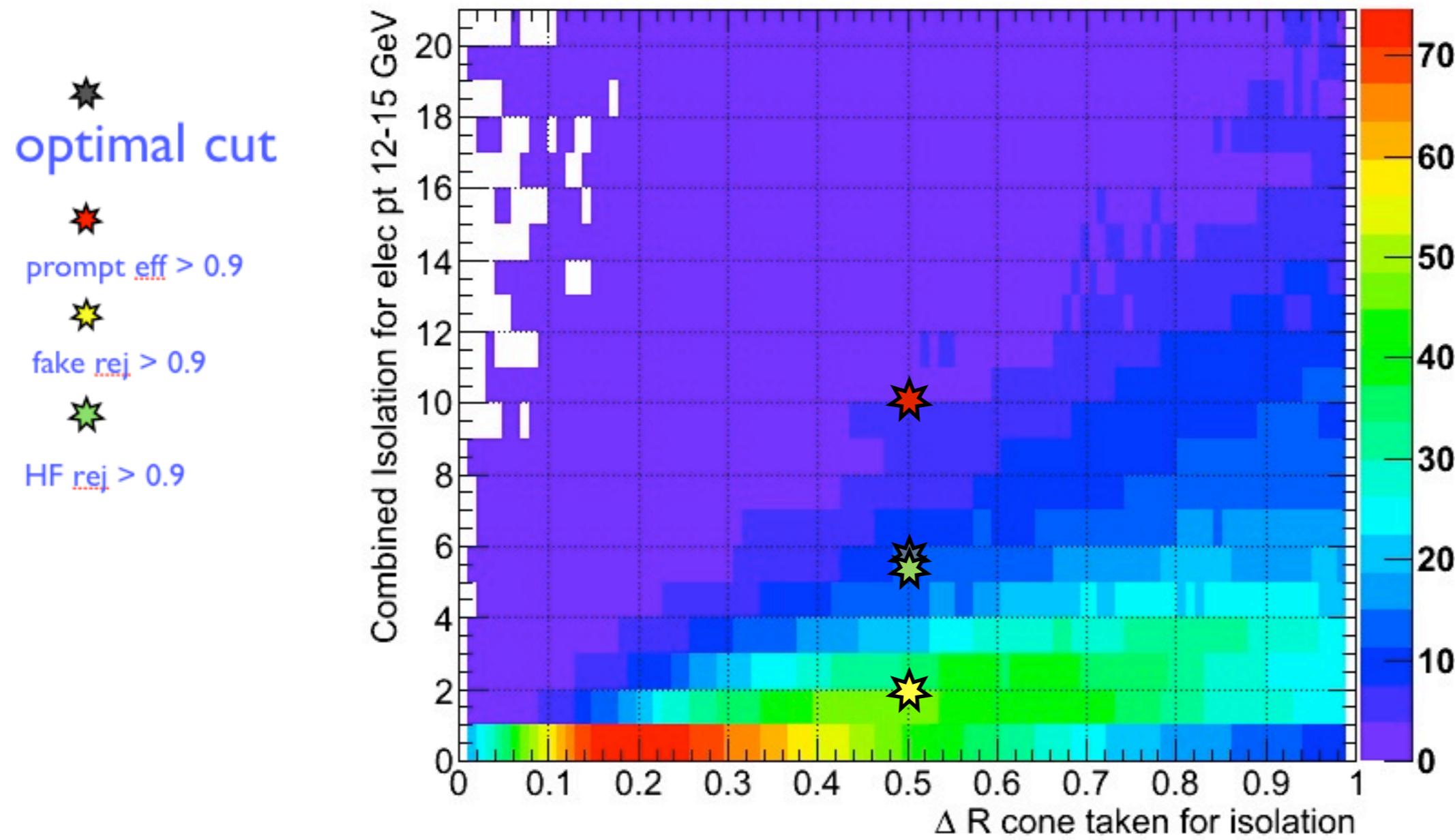
# PF Electrons pt 6-9



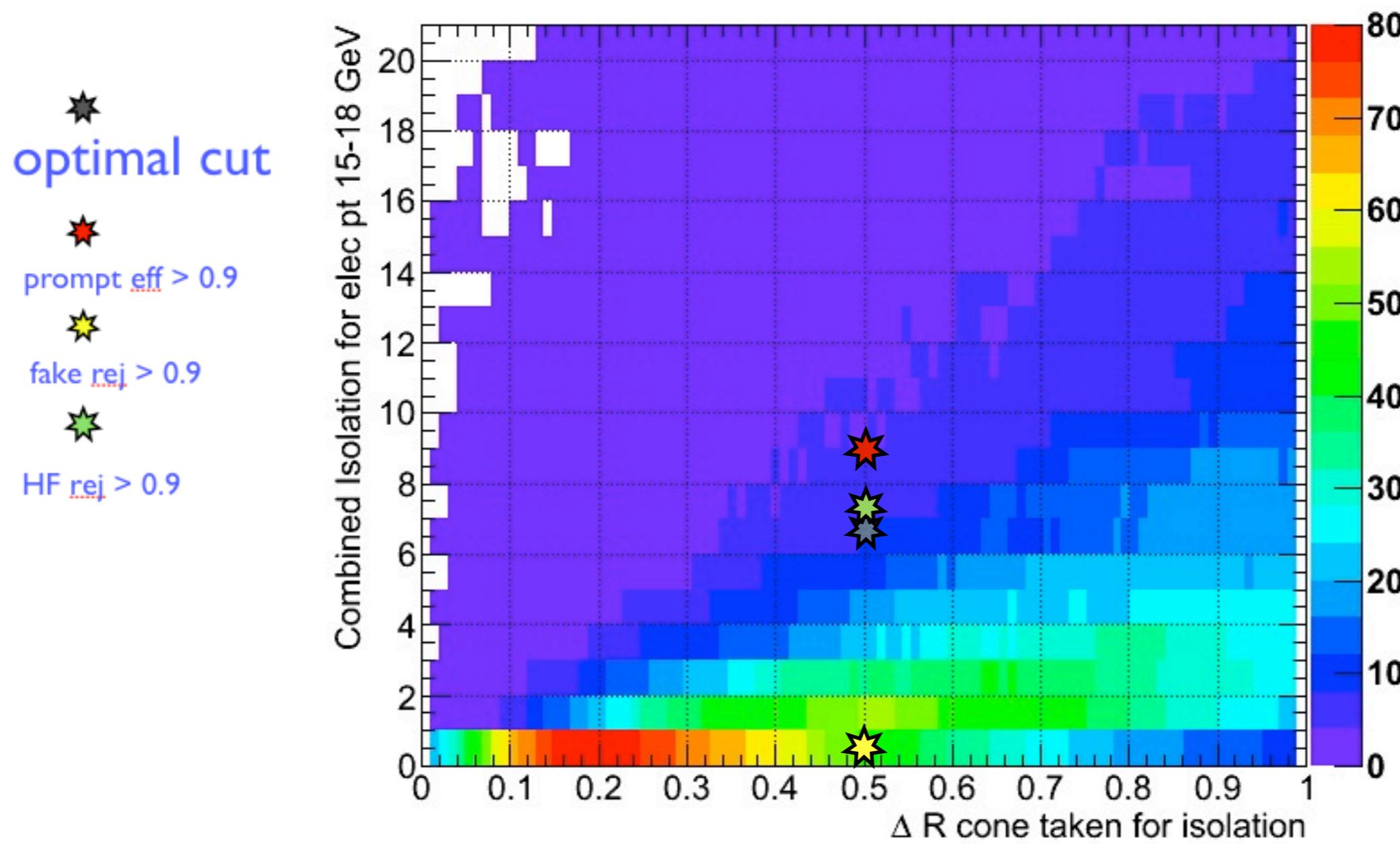
# PF Electrons pt 9-12



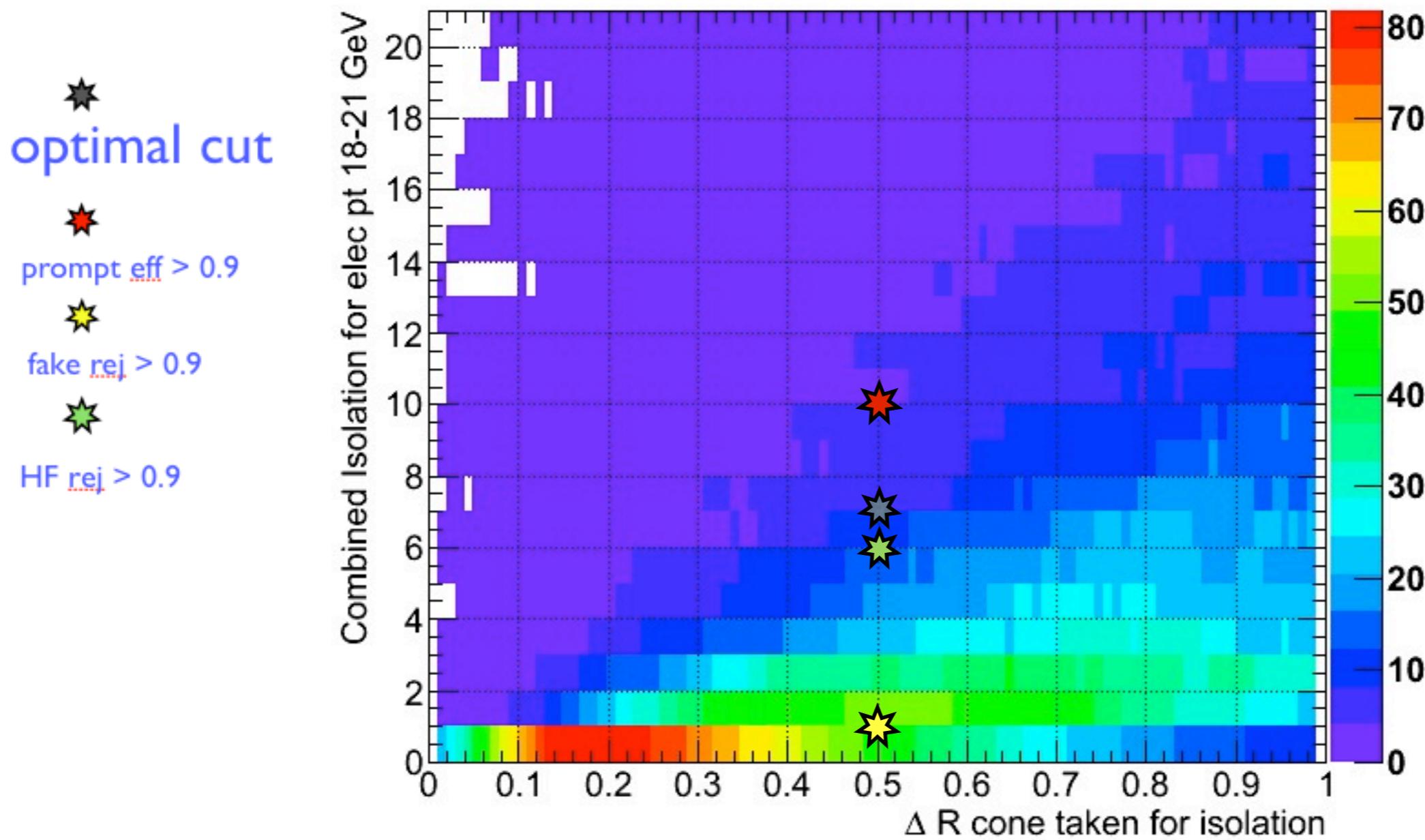
# PF Electrons pt 12-15



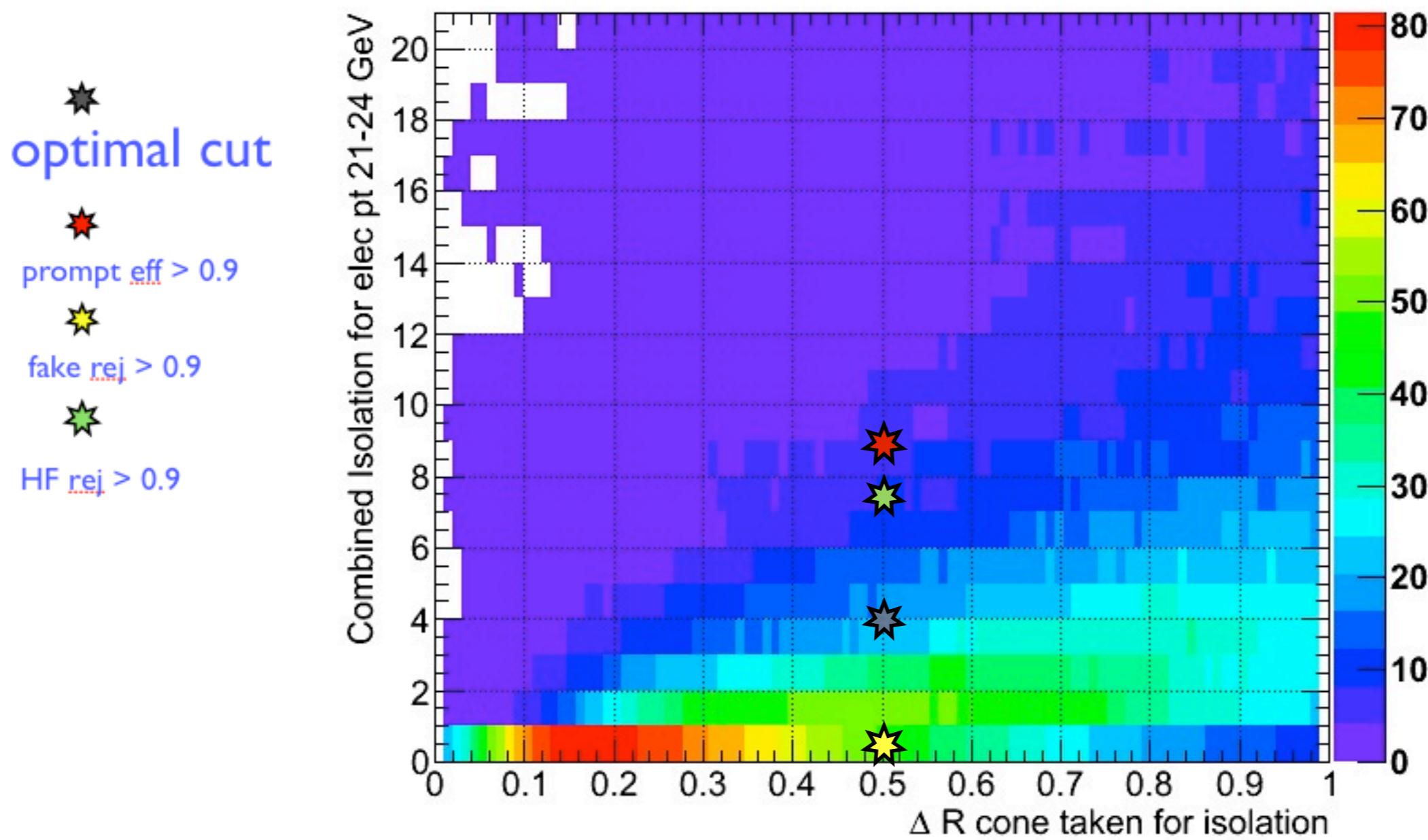
# PF Electrons pt 15-18



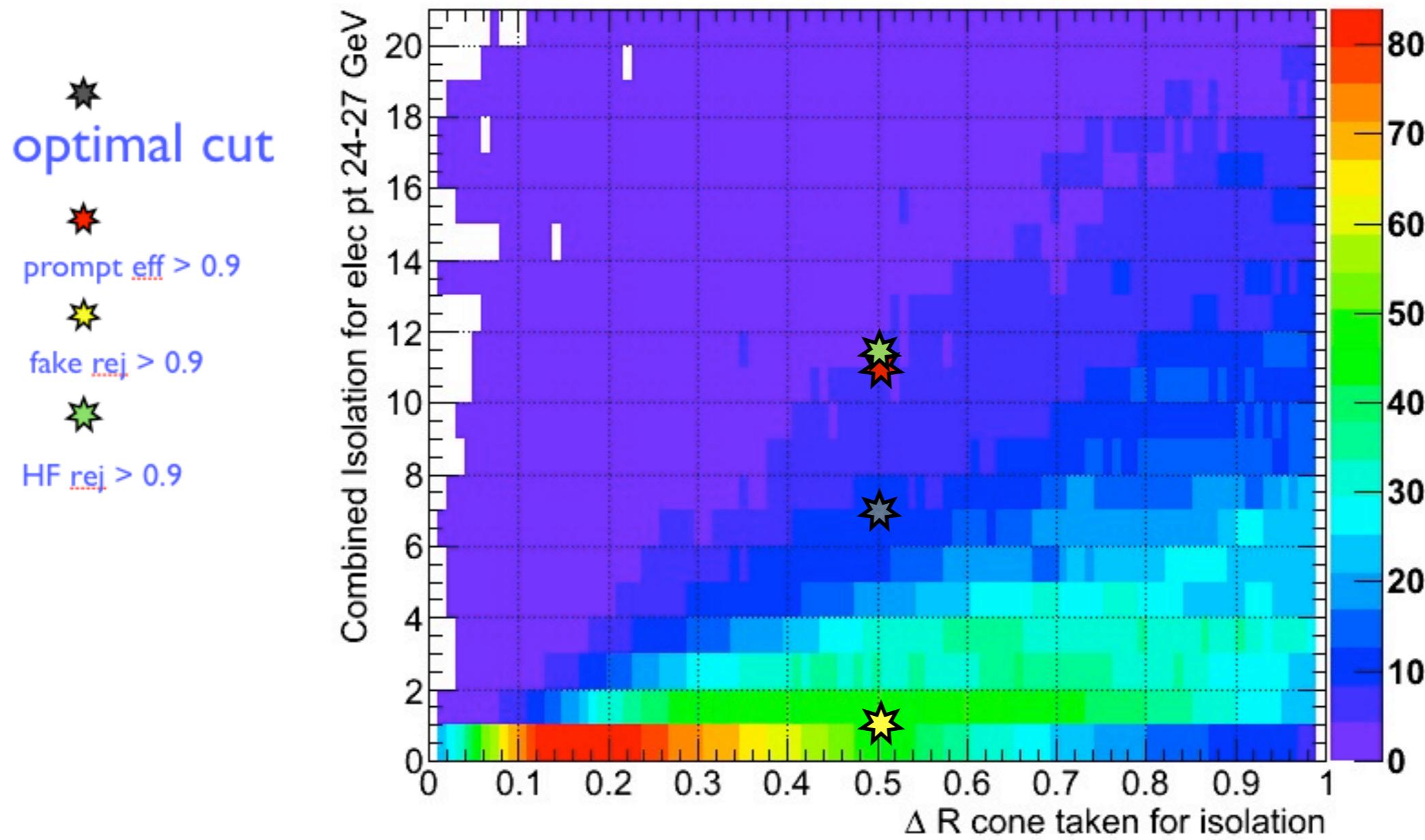
# PF Electrons pt 18-21



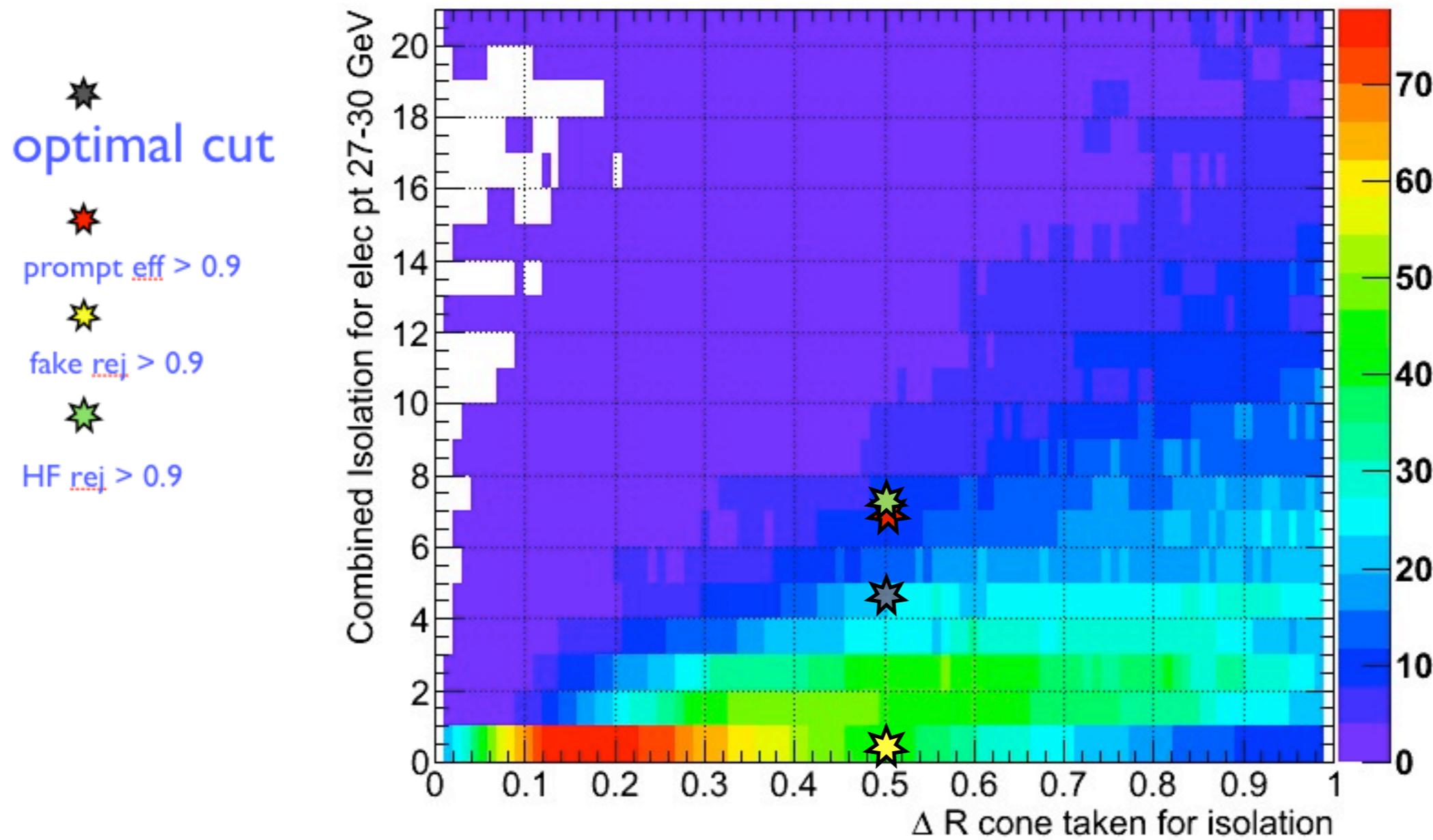
# PF Electrons pt 21-24



# PF Electrons pt 24-27



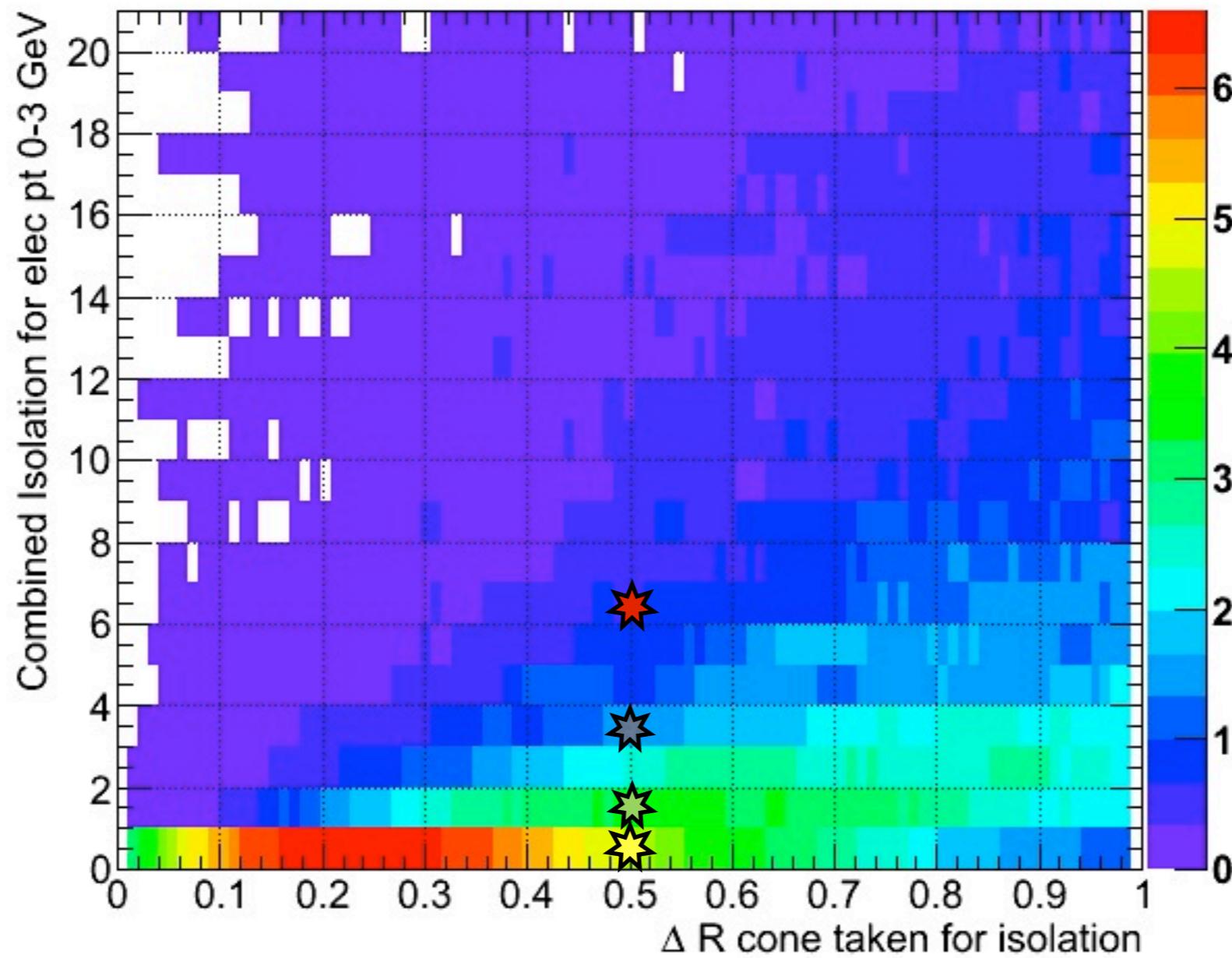
# PF Electrons pt 27-30



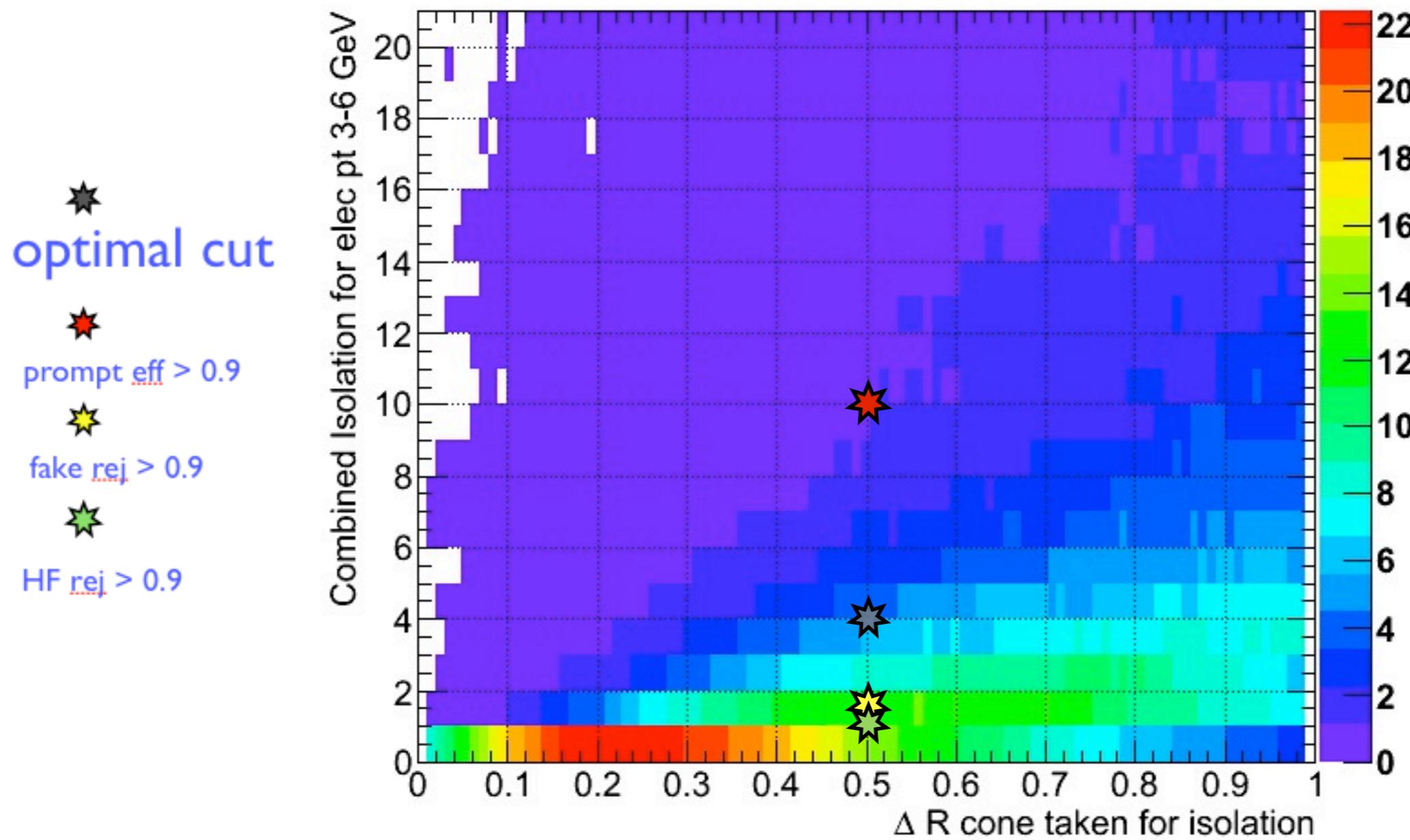
Id Tight

# PF Electrons pt 0-3

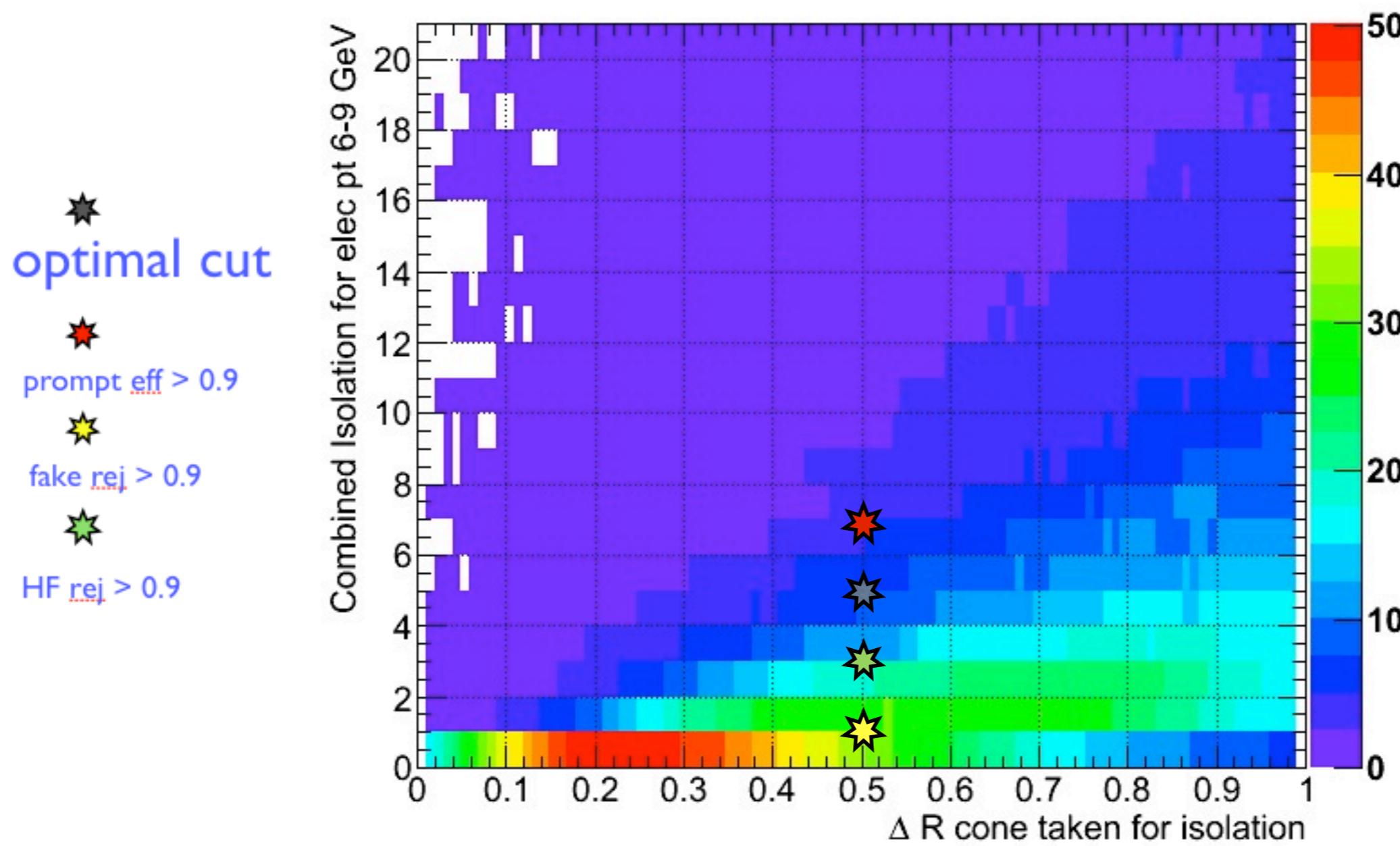
- ★ optimal cut
- ★ prompt eff > 0.9
- ★ fake rej > 0.9
- ★ HF rej > 0.9



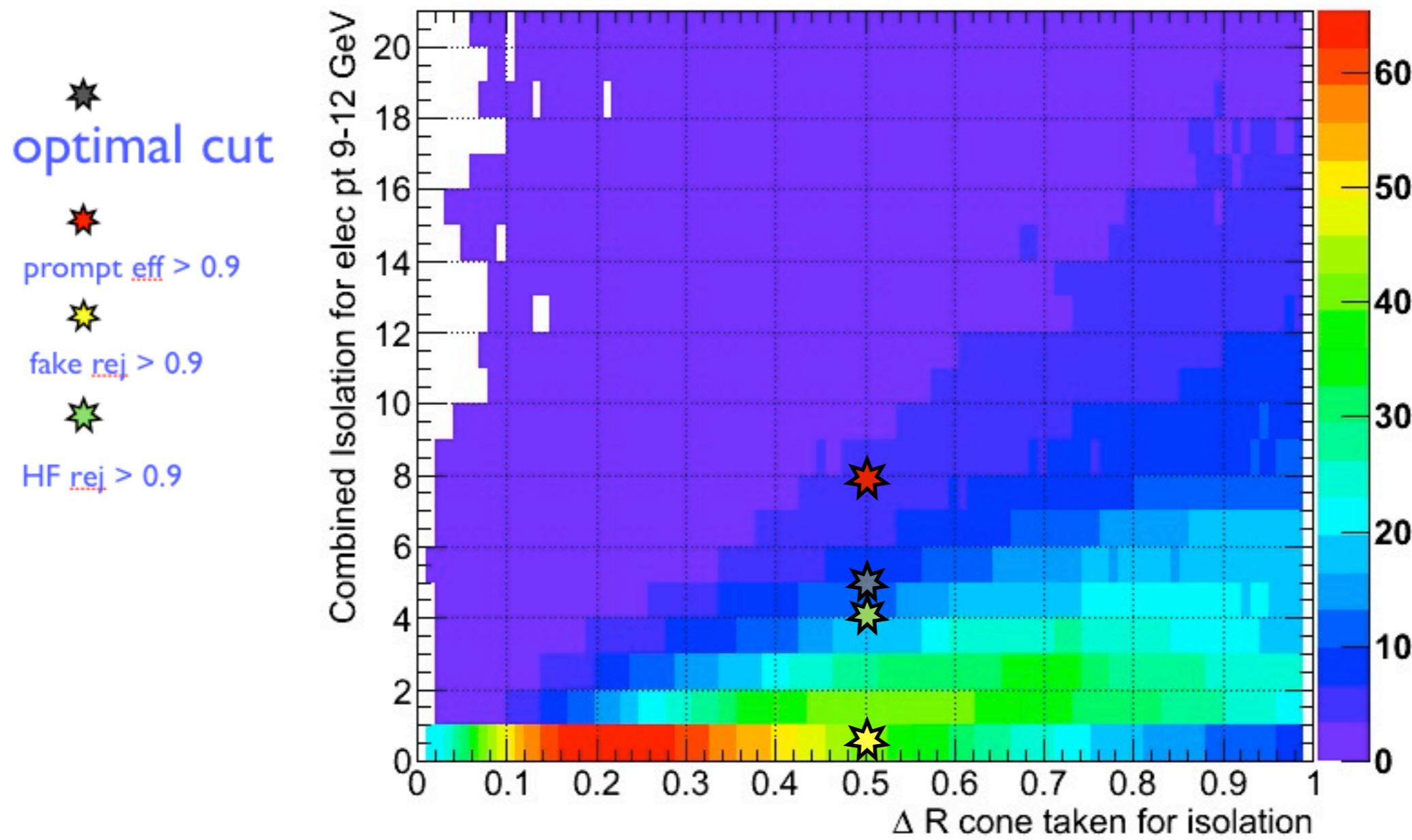
# PF Electrons pt 3-6



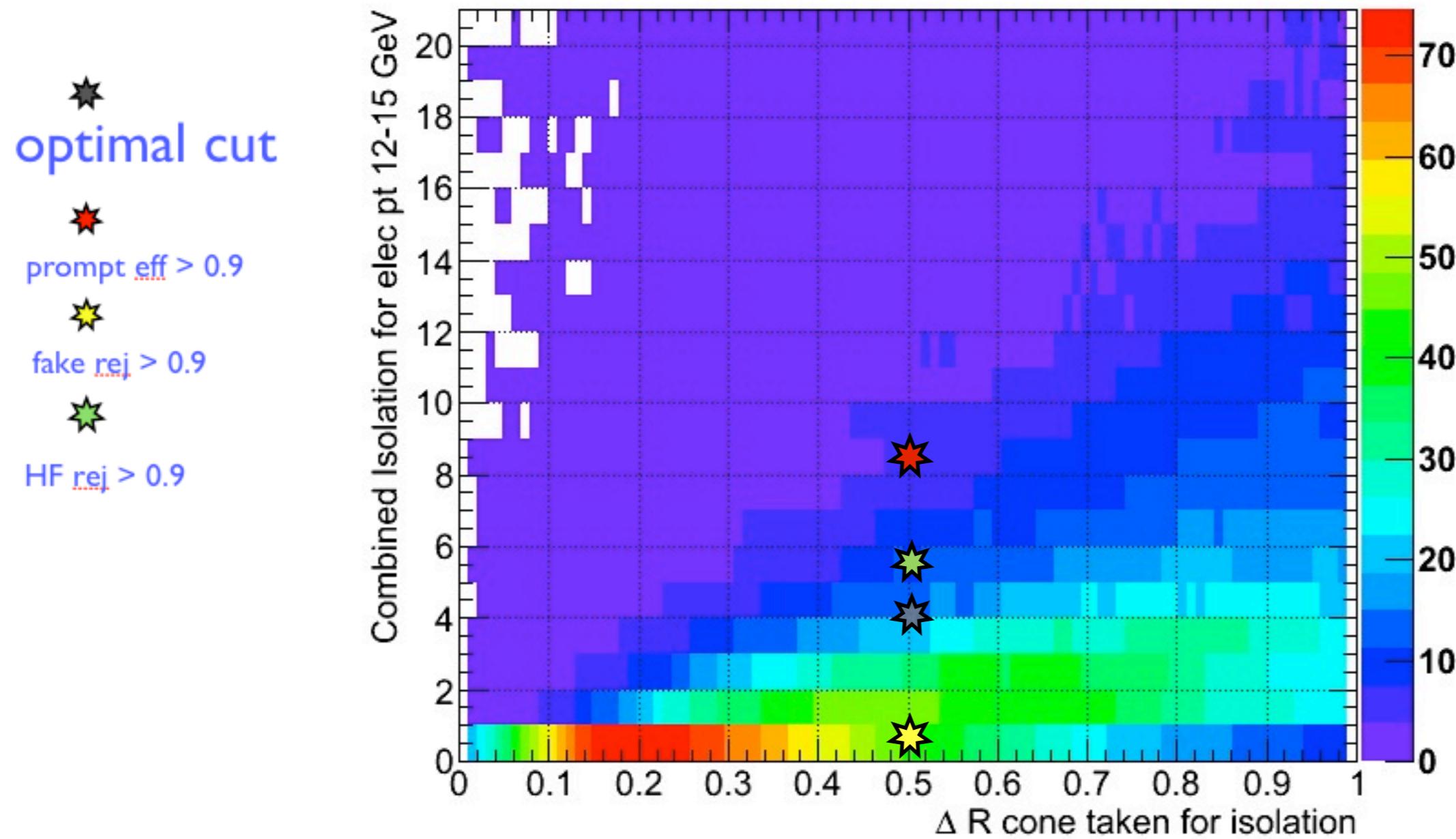
# PF Electrons pt 6-9



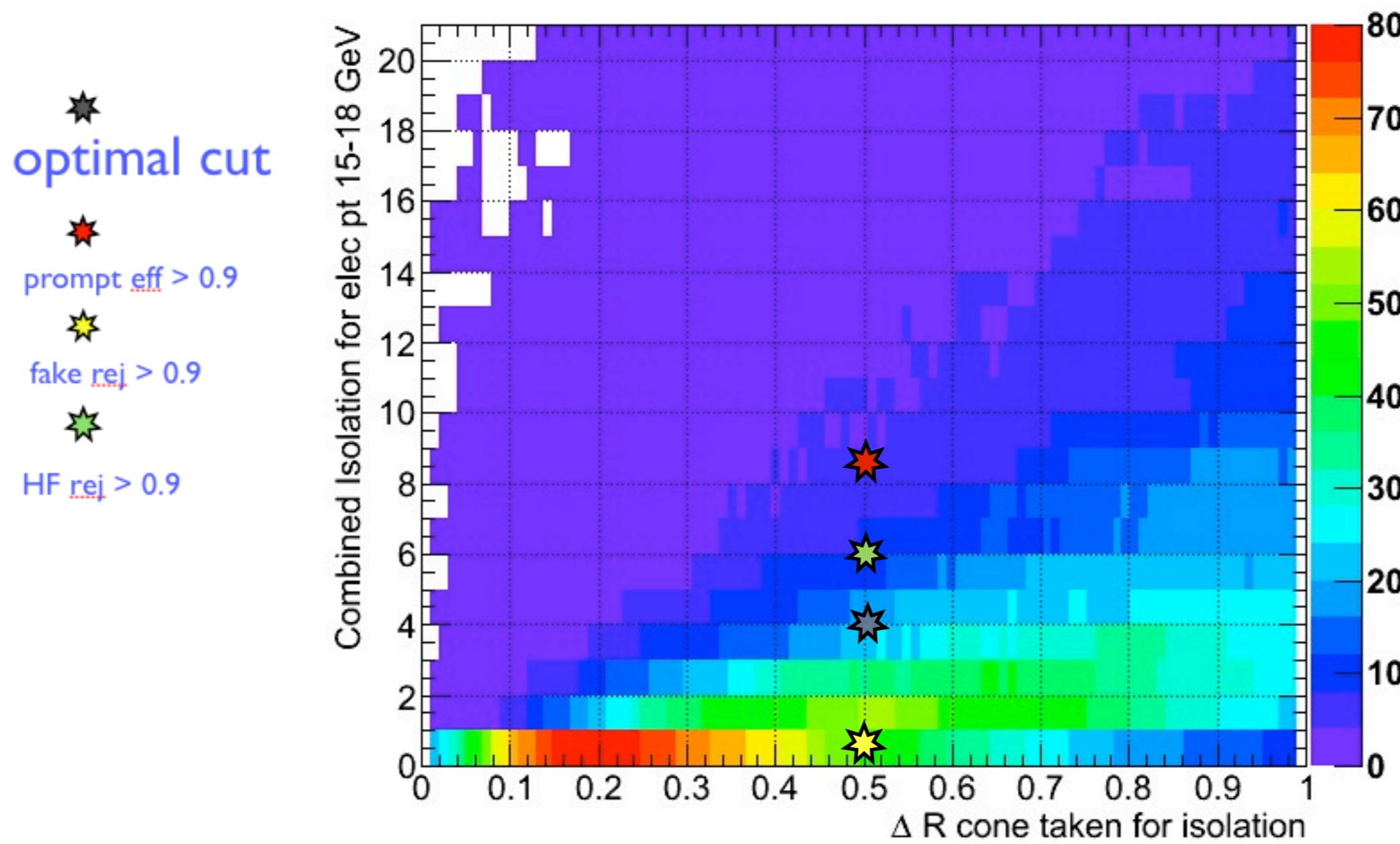
# PF Electrons pt 9-12



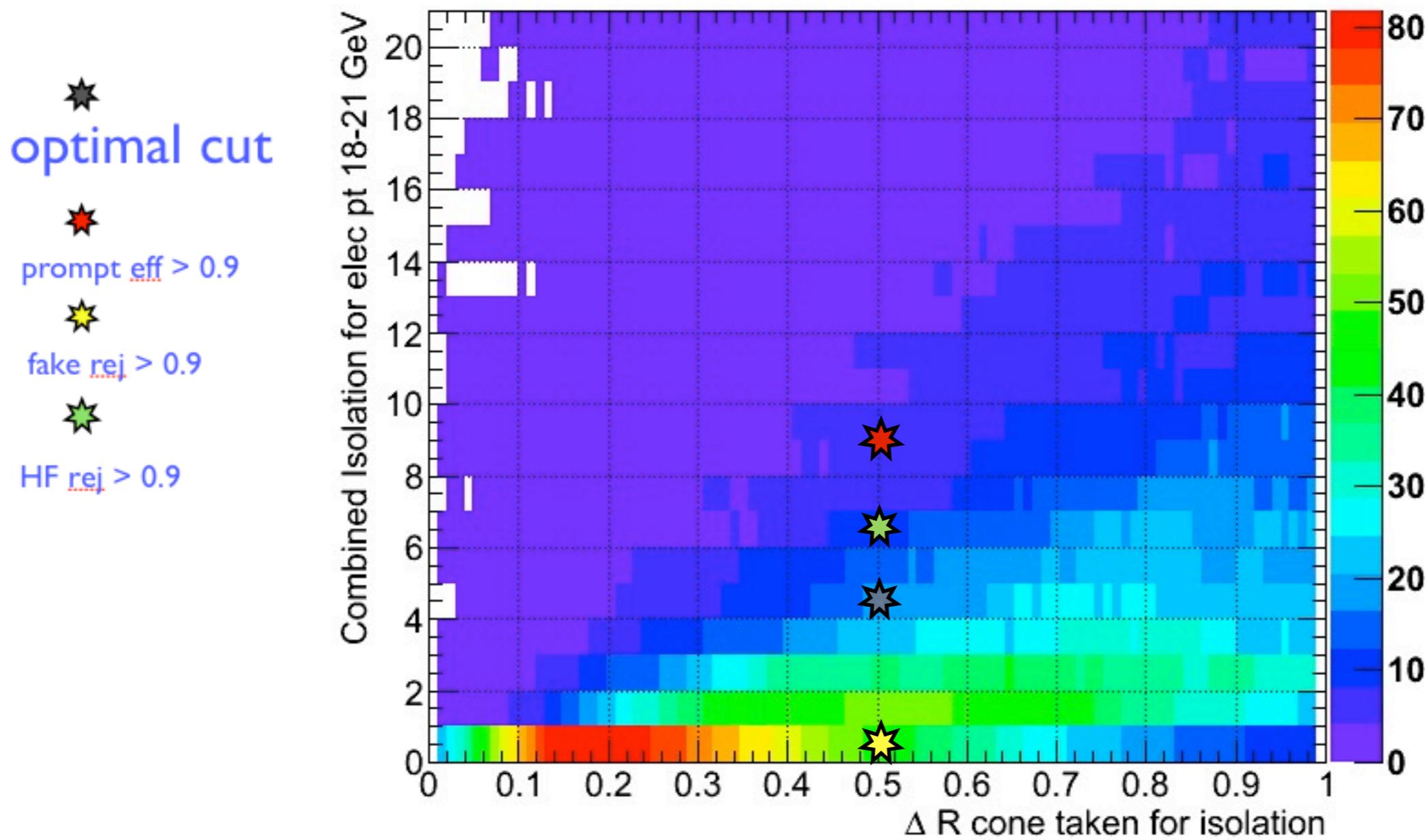
# PF Electrons pt 12-15



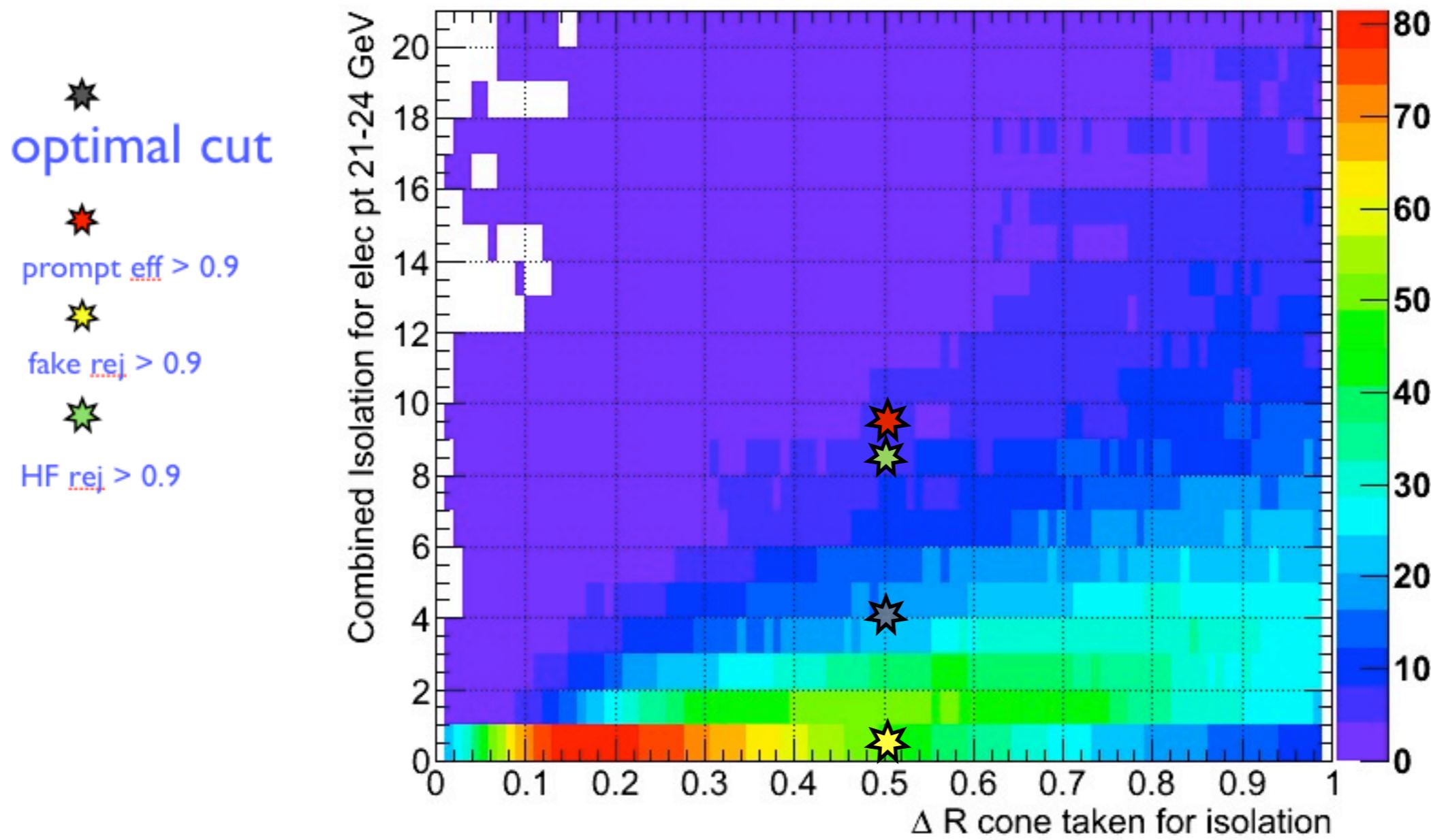
# PF Electrons pt 15-18



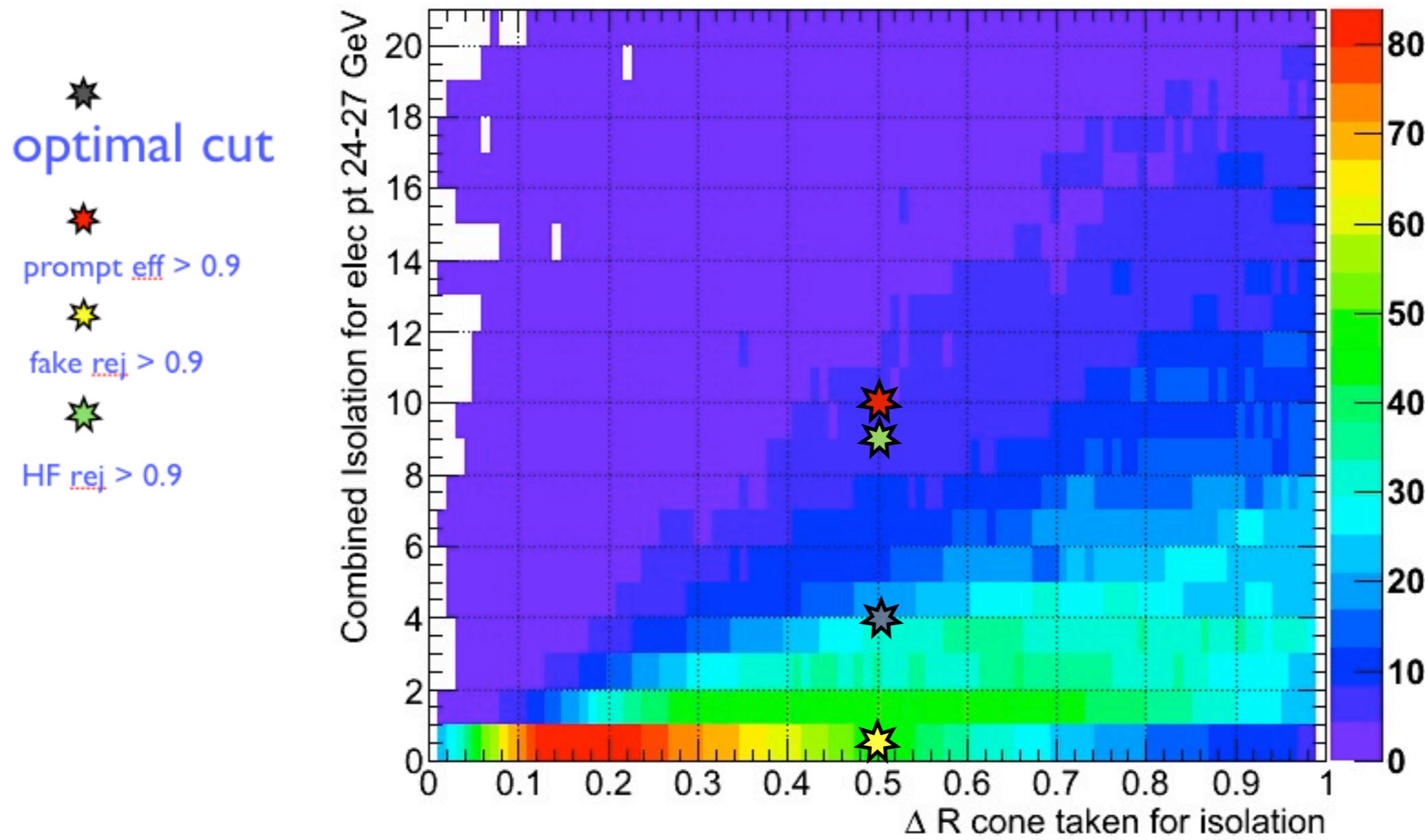
# PF Electrons pt 18-21



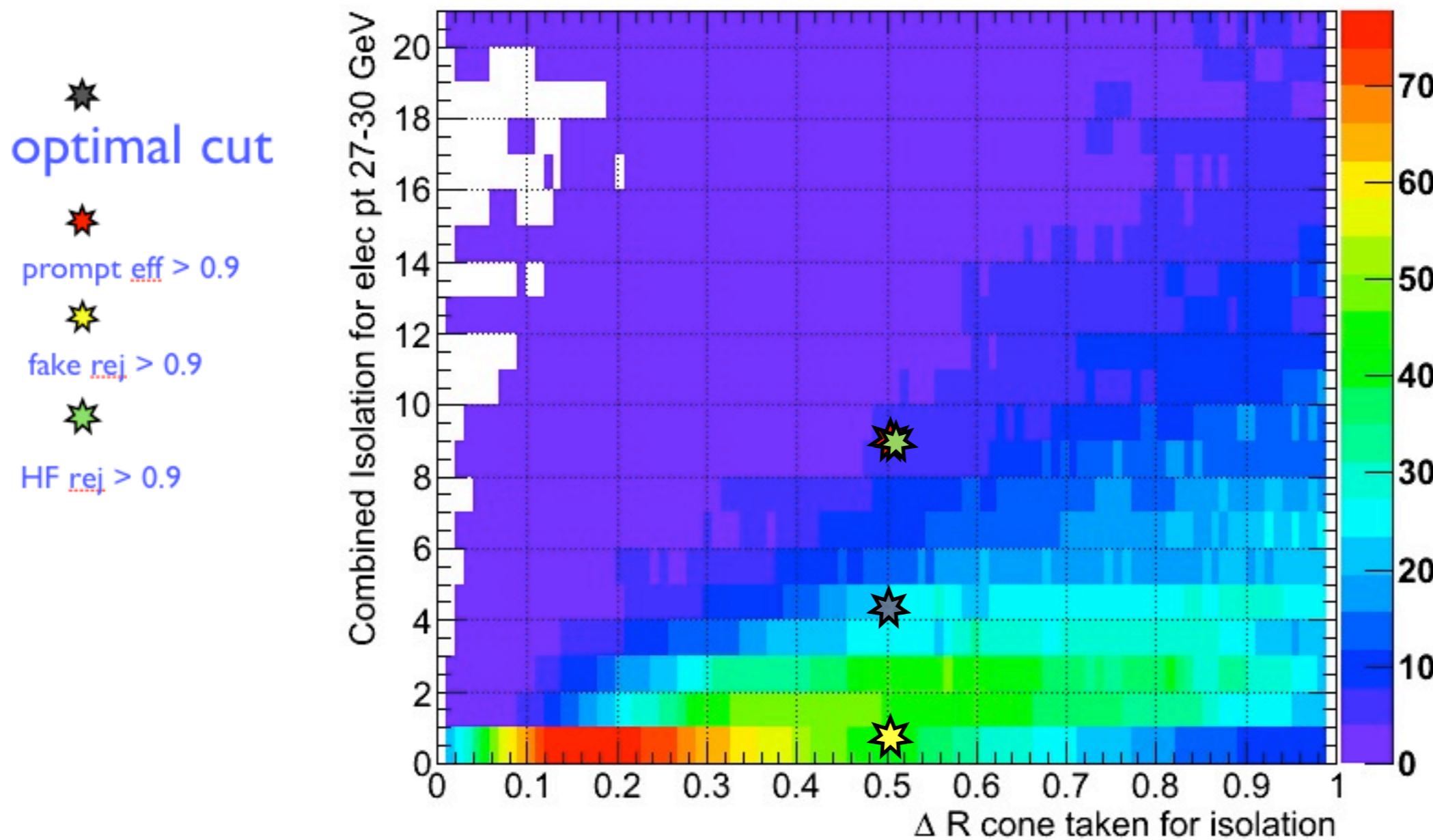
# PF Electrons pt 21-24



# PF Electrons pt 24-27



# PF Electrons pt 27-30



Fake rejection in mva and hoe optimisation is comparable with SR Id Tight.

# Significance tables

# Reference

Standard Reco Jets and MET and Standard Reco leptons.

Single Lepton!!

Sample	electrons			
	V+j pt 10	SL opt::pt10	SL opt::pt5	SL opt::pt2
LM0	83.6766	111.075	114.214	114.394
LM1	9.58411	12.9456	13.7438	13.7859
QCD 250-500	0	0	0	0
QCD 500-1000	0	0	2.99489	2.99489
QCD 1000-Inf	0.62144	0.764849	0.908258	1.05167
BB	0	0	0	0
WJets	314.937	402.42	402.42	402.42
TT Bar Jets	124.005	153.266	156.027	156.135
Sig LM0	3.99074	4.70874	4.81635	4.82283
Sig LM1	0.45709	0.548793	0.579566	0.581214

Standard Reco Jets and MET and Standard Reco leptons.

Same Sign Double Lepton!!

Sample	electron electron			
	V+j pt 10	SL opt::pt10	SL opt::pt5	SL opt::pt2
LM0	1.39012	2.17487	2.28698	2.28698
LM1	0.222037	0.376619	0.404725	0.404725
QCD 250-500	0	0	0	0
QCD 500-1000	0	0	0	0
QCD 1000-Inf	0	0	0	0
BB	0	0	0	0
WJets	0	0	0	0
TT Bar Jets	0.0541384	0.324831	0.433107	0.433107
Sig LM0	5.97449	3.81597	3.47508	3.47508
Sig LM1	0.954271	0.660806	0.614982	0.614982

## PF elTight

Particle Flow Jets and MET and Particle Flow leptons.

Single Lepton!!

Sample	electrons			
	V+j pt 10	SL opt::pt10	SL opt::pt5	SL opt::pt2
LM0	83.542	74.9322	76.9053	76.995
LM1	9.53633	9.24122	9.88766	9.91857
QCD 250-500	0	0	0	0
QCD 500-1000	0	0	0	0
QCD 1000-Inf	0.430228	0.334622	0.430228	0.430228
BB	0	0	0	0
WJets	209.958	192.462	192.462	192.462
TT Bar Jets	75.3065	68.2685	69.7844	69.8386
Sig LM0	4.94258	4.63761	4.74511	4.75015
Sig LM1	0.564196	0.571946	0.610075	0.611919

Particle Flow Jets and MET and Particle Flow leptons.

Same Sign Double Lepton!!

Sample	electron electron			
	V+j pt 10	SL opt::pt10	SL opt::pt5	SL opt::pt2
LM0	1.5695	1.18833	1.30044	1.30044
LM1	0.269817	0.241711	0.269817	0.269817
QCD 250-500	0	0	0	0
QCD 500-1000	0	0	0	0
QCD 1000-Inf	0	0	0	0
BB	0	0	0	0
WJets	0	0	0	0
TT Bar Jets	0	0.0541384	0.0541384	0.0541384
Sig LM0	inf	5.10723	5.58904	5.58904
Sig LM1	inf	1.03883	1.15962	1.15962

PF  $0.6 < \text{mva} < 1$  and  $H/\text{E} < 0.002$

Particle Flow Jets and MET and Particle Flow leptons.

Single Lepton!!

Sample	electrons			
	V+j pt 10	SL opt::pt10	SL opt::pt5	SL opt::pt2
LM0	80.3325	108.488	111.806	112.291
LM1	11.1596	14.4019	15.4503	15.5646
QCD 250-500	0	0	0	0
QCD 500-1000	0	2.59185	2.59185	2.59185
QCD 1000-Inf	0.579179	1.11699	1.28247	1.48932
BB	0	0	0	0
WJets	181.703	211.986	211.986	211.986
TT Bar Jets	12.6071	17.476	18.5068	18.8148
Sig LM0	5.75304	7.10465	7.30324	7.32657
Sig LM1	0.799201	0.943156	1.00922	1.01553

Particle Flow Jets and MET and Particle Flow leptons.

Same Sign Double Lepton!!

Sample	electron electron			
	V+j pt 10	SL opt::pt10	SL opt::pt5	SL opt::pt2
LM0	1.41649	2.60013	2.83298	2.85238
LM1	0.296747	0.479173	0.535117	0.552144
QCD 250-500	0	0	0	0
QCD 500-1000	0	0	0	0
QCD 1000-Inf	0	0	0	0
BB	0	0	0	0
WJets	0	0	0	0
TT Bar Jets	0	0.0937053	0.140558	0.515379
Sig LM0	inf	8.49402	7.55642	3.97324
Sig LM1	inf	1.56535	1.42732	0.76911

# Reference

Standard Reco Jets and MET and Standard Reco leptons.

Single Lepton!!

Sample	electrons	V+j pt 10	SL opt::pt10	SL opt::pt5	SL opt::pt2
LMO	83.6766	111.075	114.214	114.394	
LM1	9.58411	12.9456	13.7438	13.7859	
QCD 250-500	0	0	0	0	
QCD 500-1000	0	0	2.99489	2.99489	
QCD 1000-Inf	0.62144	0.764849	0.908258	1.05167	
BB	0	0	0	0	
WJets	314.937	402.42	402.42	402.42	
TT Bar Jets	124.085	153.266	156.027	156.135	
Sig LMO	3.99074	4.70874	4.81635	4.82283	
Sig LM1	0.45709	0.548793	0.579566	0.581214	

Standard Reco Jets and MET and Standard Reco leptons.

Same Sign Double Lepton!!

Sample	electron electron	V+j pt 10	SL opt::pt10	SL opt::pt5	SL opt::pt2
LMO	1.39012	2.17487	2.28698	2.28698	
LM1	0.222037	0.376619	0.404725	0.404725	
QCD 250-500	0	0	0	0	
QCD 500-1000	0	0	0	0	
QCD 1000-Inf	0	0	0	0	
BB	0	0	0	0	
WJets	0	0	0	0	
TT Bar Jets	0.0541384	0.324831	0.433107	0.433107	
Sig LMO	5.97449	3.81597	3.47508	3.47508	
Sig LM1	0.954271	0.660806	0.614982	0.614982	

## PF no id selection

Particle Flow Jets and MET and Particle Flow leptons.

Single Lepton!!

Sample	electrons	V+j pt 10	SL opt::pt10	SL opt::pt5	SL opt::pt2
LMO	107.595	101.444	124.709	155.872	
LM1	15.0538	15.3749	21.0374	26.194	
QCD 250-500	0	0	0	0	
QCD 500-1000	0	0	5.1837	10.3674	
QCD 1000-Inf	14.1899	13.4038	26.4767	62.4272	
BB	0	0	0	0	
WJets	287.696	272.554	287.696	348.263	
TT Bar Jets	25.6264	23.848	28.299	33.7808	
Sig LMO	5.94535	5.76344	6.68844	7.30869	
Sig LM1	0.831824	0.873509	1.12828	1.22821	

Particle Flow Jets and MET and Particle Flow leptons.

Same Sign Double Lepton!!

Sample	electron electron	V+j pt 10	SL opt::pt10	SL opt::pt5	SL opt::pt2
LMO	3.18225	2.81358	4.65695	7.78099	
LM1	0.627546	0.591061	1.1432	1.78778	
QCD 250-500	0	0	0	0	
QCD 500-1000	0	0	2.59185	10.3674	
QCD 1000-Inf	0.206849	0.206849	0.620548	5.12987	
BB	0	0	0	0	
WJets	15.1419	0	0	0	
TT Bar Jets	0.509084	0.374821	0.843348	1.7804	
Sig LMO	0.796614	3.6891	2.31242	1.87194	
Sig LM1	0.157094	0.774986	0.567661	0.430102	

## PF no idTight fake rejection

Particle Flow Jets and MET and Particle Flow leptons.

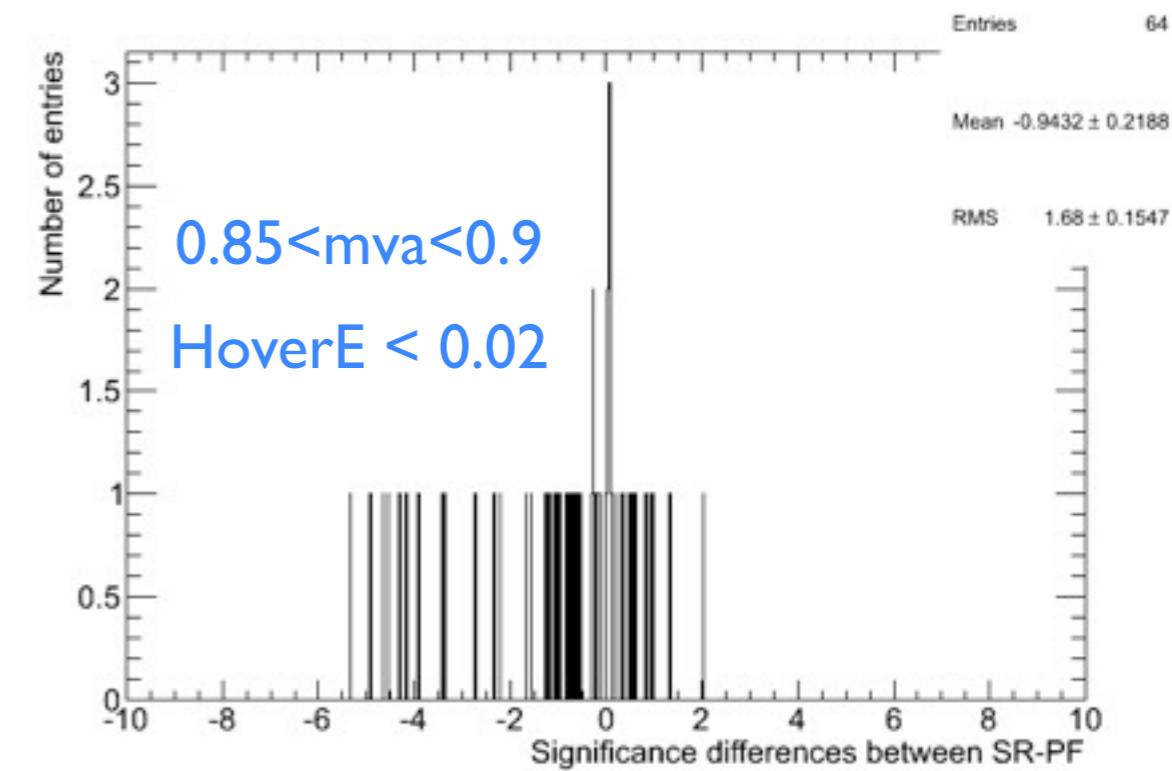
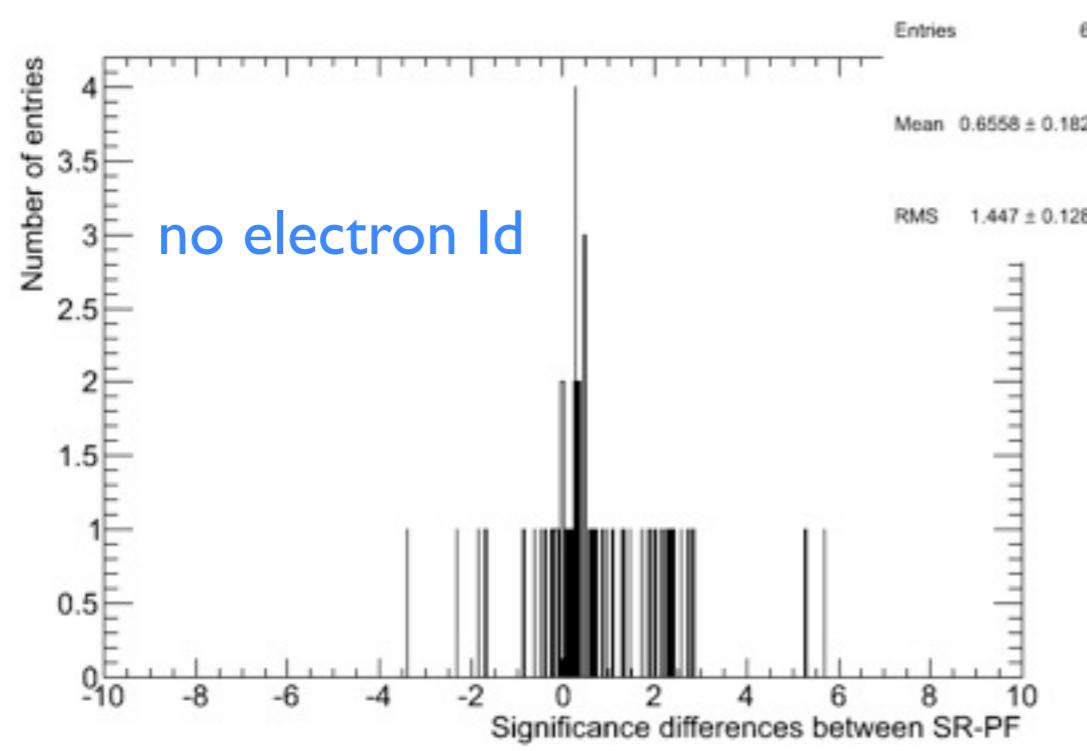
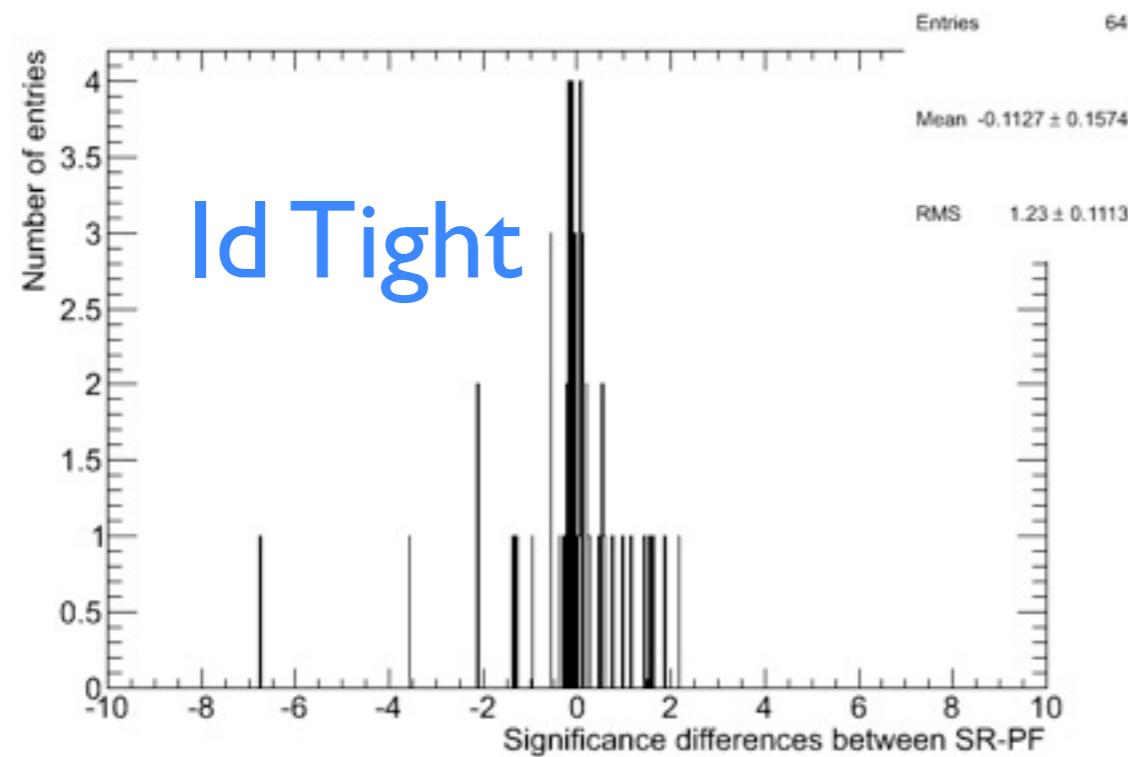
Single Lepton!!

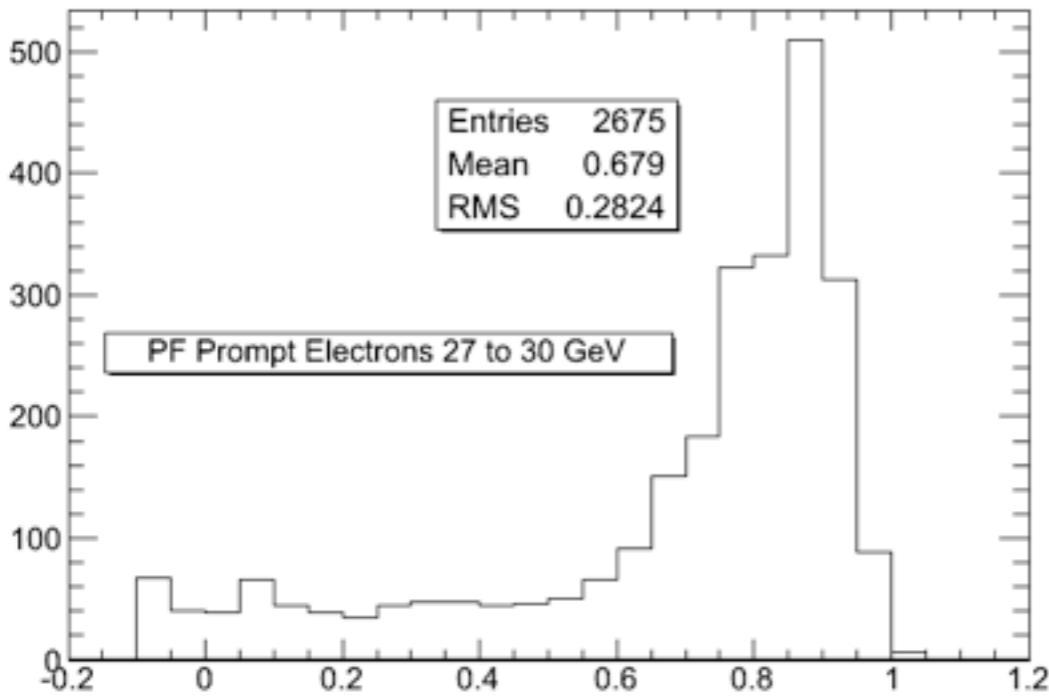
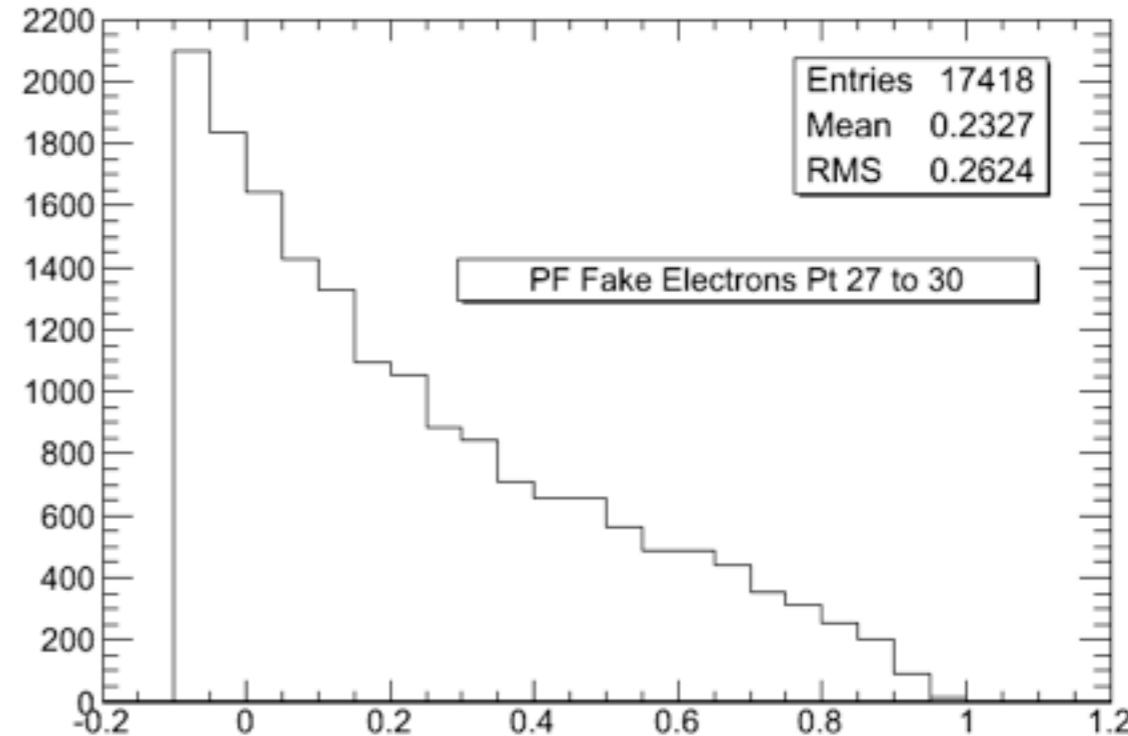
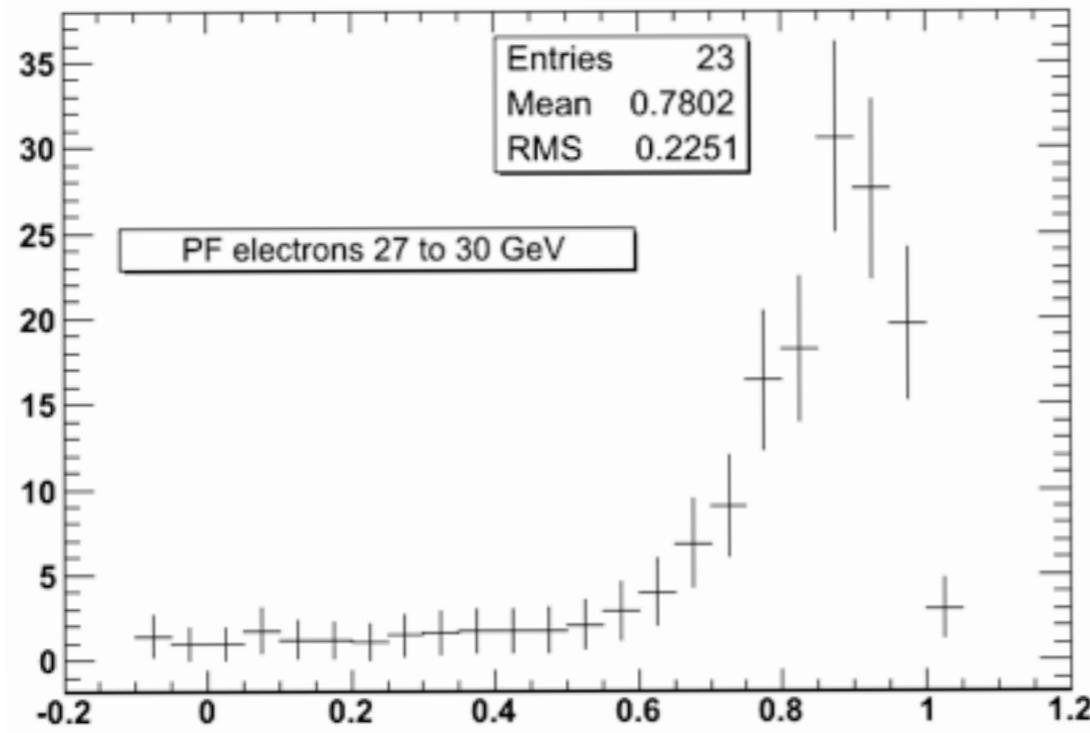
Sample	electrons	V+j pt 10	SL opt::pt10	SL opt::pt5	SL opt::pt2
LMO	63.629	45.6049	46.8451	46.9451	
LM1	10.5057	6.75977	7.28882	7.31891	
QCD 250-500	0	0	0	0	
QCD 500-1000	0	0	0	0	
QCD 1000-Inf	0.597033	0.426452	0.469098	0.511743	
BB	0	0	0	0	
WJets	187.304	109.261	109.261	109.261	
TT Bar Jets	68.6301	37.6717	38.541	38.5893	
Sig LMO	5.2214	3.75685	3.84712	3.85415	
Sig LM1	0.655928	0.556858	0.59859	0.600877	

Particle Flow Jets and MET and Particle Flow leptons.

Same Sign Double Lepton!!

Sample	electron electron	V+j pt 10	SL opt::pt10	SL opt::pt5	SL opt::pt2
LMO	1.46016	0.420045	0.46005	0.46005	
LM1	0.288343	0.107815	0.120352	0.120352	
QCD 250-500	0	0	0	0	
QCD 500-1000	0	0	0	0	
QCD 1000-Inf	0	0	0	0	
BB	0	0	0	0	
WJets	0	0	0	0	
TT Bar Jets	0	0	0	0	
Sig LMO	inf	inf	inf	inf	
Sig LM1	inf	inf	inf	inf	

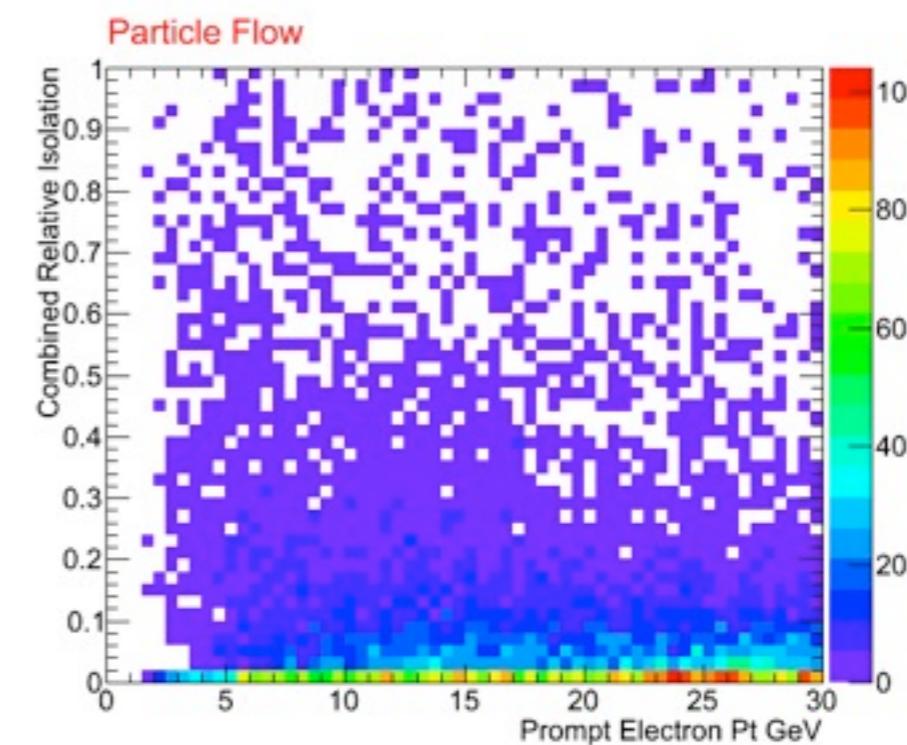
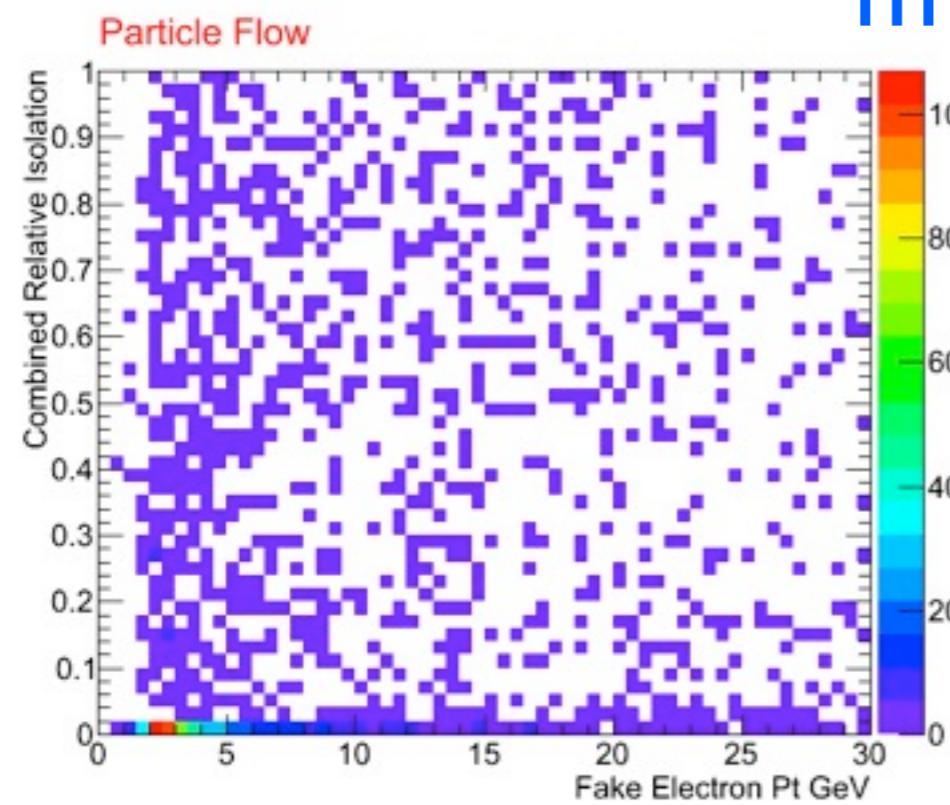
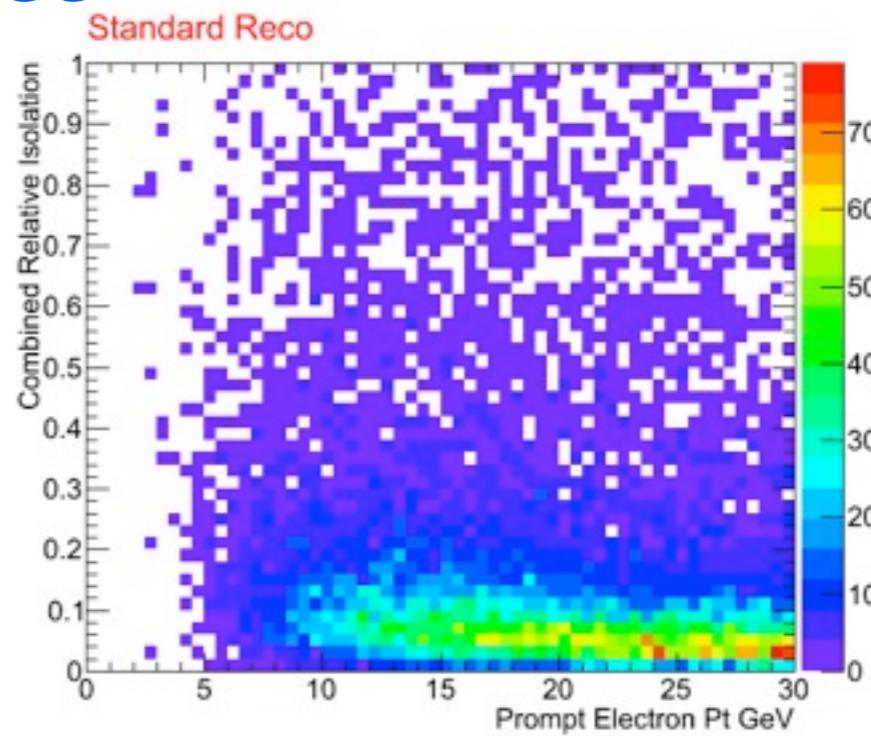
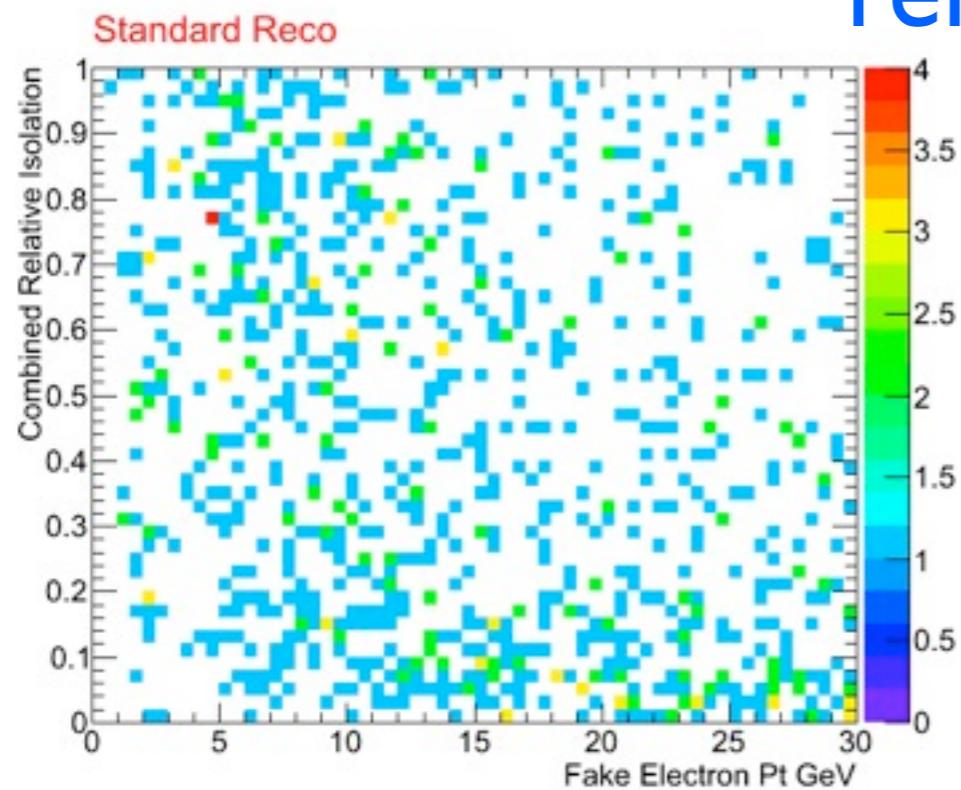




For all pt bins (0 to 3 Gev, 3 to 6, 6 to 9, ..., 27 to 30) the behaviour is almost identical, at lower pt lower statistics.

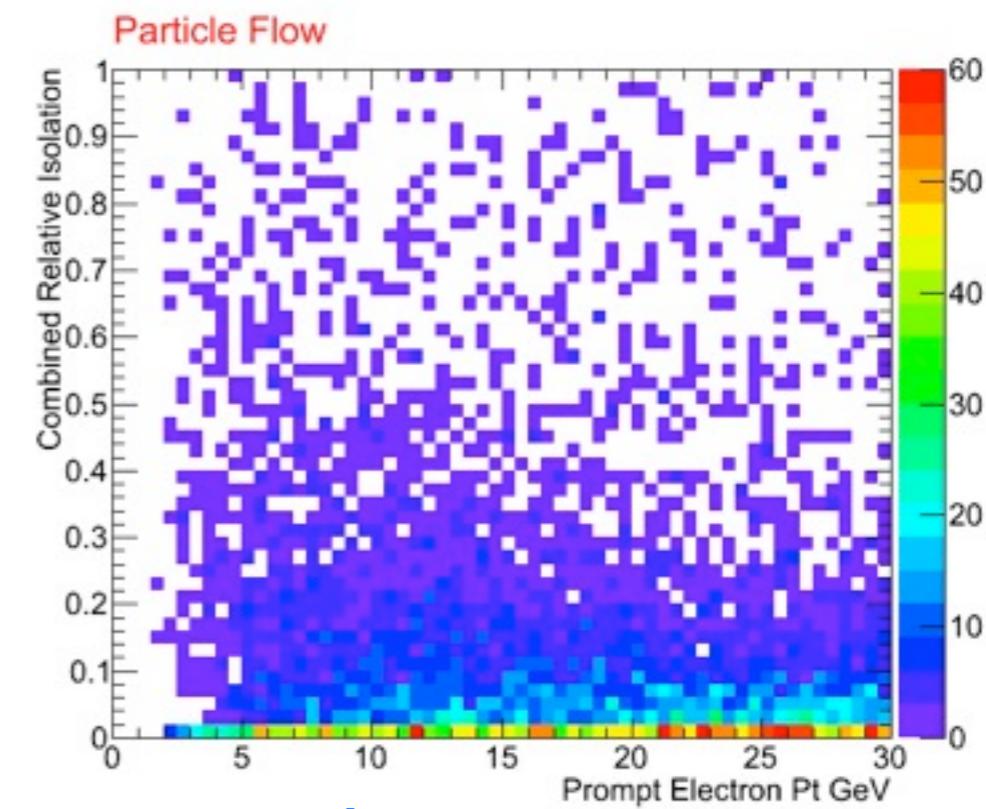
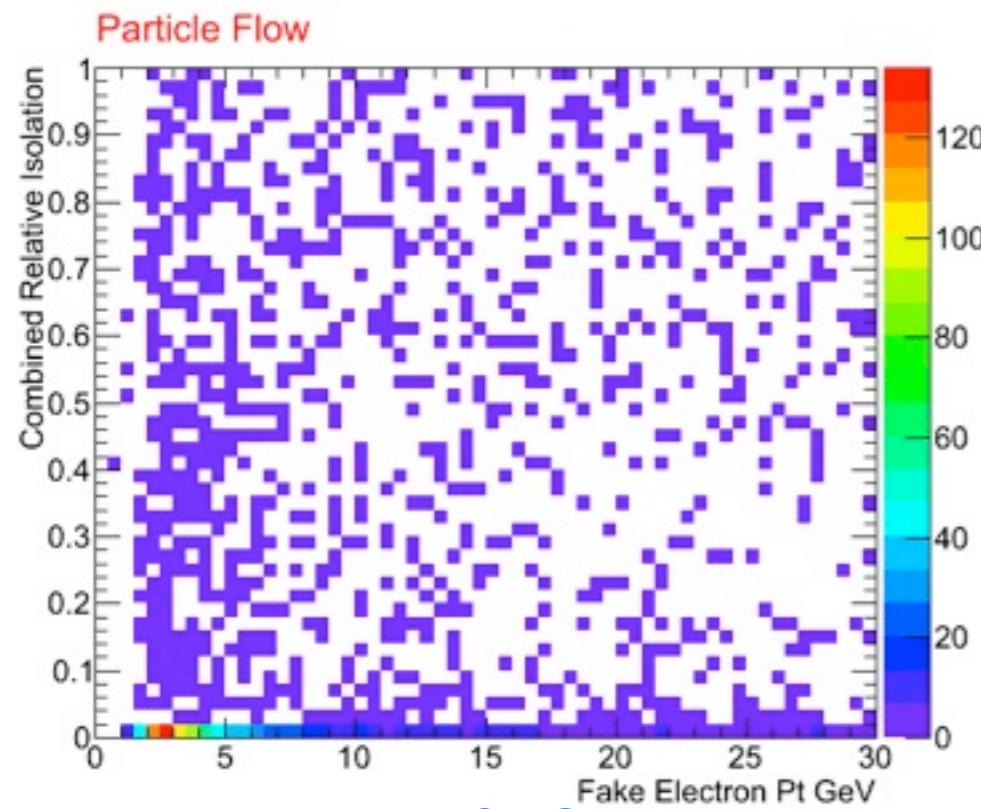
Fakes are decreasing when mva is closer to 1, however prompts seems to have the biggest acceptancy in between 0.7 to 0.95, I'm making a guess just looking at the plot.

# reference



$mva > 0.85$

$0.85 < \text{mva} < 0.9$



$0.85 < \text{mva} < 0.9 \text{ and } \text{H}/\text{E}$

